Copier

d-Copia 12

SERVICE MANUAL

Code Y101700-5

PUBBLICATION ISSUED BY:

Olivetti TECNOST S.p.A.
Documentazione
77, Via Jervis - 10015 Ivrea (Italy)

CAUTION

This product is a class 1 laser product that complies with 21CFR 1040.10 and 1040.11 of the CDRH standard and IEC825. This means that this machine does not produce hazardous laser radiation. The use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This laser radiation is not a danger to the skin, but when an exact focusing of the laser beam is achieved on the eye's retina, there is the danger of spot damage to the retina.

The following cautions must be observed to avoid exposure of the laser beam to your eyes at the time of servicing.

1) When a problem in the laser optical unit has occurred, the whole optical unit must be exchanged as a unit, not as individual parts.

2) Do not look into the machine with the main switch turned on after removing the developer unit, toner cartridge, and drum cartridge.

3) Do not look into the laser beam exposure slit of the laser optical unit with the connector connected when removing and installing the optical system.

4) The middle frame contains the safety interlock switch.
Do not defeat the safety interlock by inserting wedges or other items into the switch slot.

LASER WAVE – LENGTH : 780 ~ 795
Pulse times : 0.481 ms/6 mm
Out put power : 0.20 ± 0.03 mW

CAUTION

INVISIBLE LASER RADIATION,
WHEN OPEN AND INTERLOCKS DEFEATED.
AVOID EXPOSURE TO BEAM.

VORSICHT

UNSICHTBARE LASERSTRAHLUNG,
WENN ABDECKUNG GEÖFFNET UND
SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT.
NICHT DEM STRAHL AUSSETZEN.

VARO !

AVATTAESSA JA SUOJALUKITUS
OHITETTAESSA OLET ALTTIINA
NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE ÄLÄ
KATSO SÄTEESEEN.

ADVARSEL

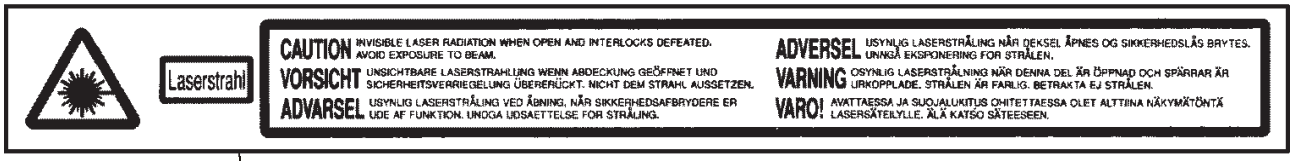
USYNLIG LASERSTRÅLNING VED ÅBNING, NÅR
SIKKERHEDSBRYDERE ER UDE AF
FUNKTION. UNDGÅ UDSAETTELSE FOR
STRÅLNING.

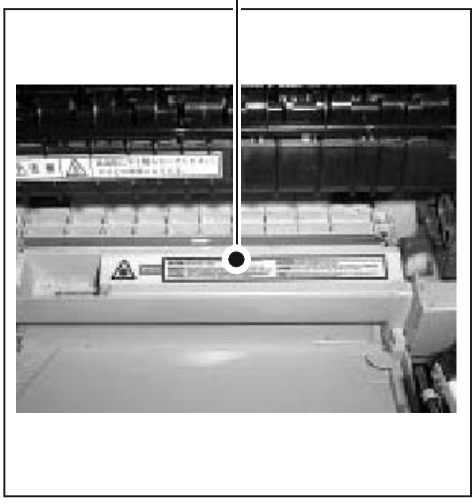
VARNING !

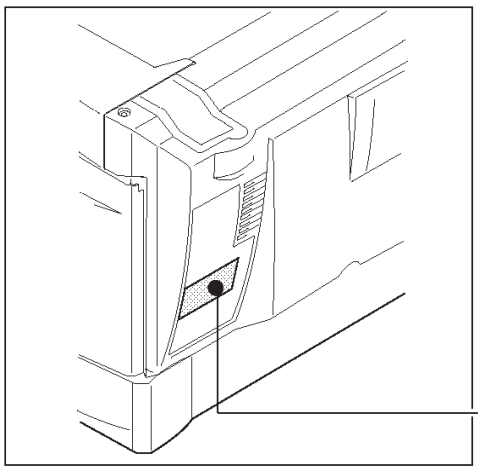
OSYNLIG LASERSTRÅLNING NÄR DENNA DEL
ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD.
BETRAKTA EJ STRÅLEN. – STRÅLEN ÄR FARLIG.

At the production line, the output power of the scanner unit is adjusted to 0.57 MILLI-WATT PLUS 20 PCTS and is maintained constant by the operation of the Automatic Power Control (APC). Even if the APC circuit fails in operation for some reason, the maximum output power will only be 15 MILLI-WATT 0.1 MICRO-SEC. Giving an accessible emission level of 42 MICRO-WATT which is still-less than the limit of CLASS-1 laser product.

Caution
This product contains a low power laser device. To ensure continued safety do not remove any cover or attempt to gain access to the inside of the product. Refer all servicing to qualified personnel.



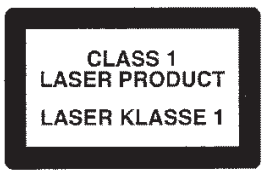




The foregoing is applicable only to the 220V model, 230V model and 240V model.

VAROITUS! LAITTEEN KÄYTTÄMINEN MUULLA KUIN TÄSSÄ KÄYTTÖOHJEESSA MAINITULLA TAVALLA SAATTAA ALTISTAA KÄYTTÄJÄN TURVALLISUUSLUOKAN 1 YLITTÄVÄLLE NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE.

VARNING - OM APPARATEN ANVÄNDS PÅ ANNAT SÄTT ÄN I DENNA BRUKSANVISNING SPECIFICERATS, KAN ANVÄNDAREN UTSÄTTAS FÖR OSYNLIG LASERSTRÅLNING, SOM ÖVERSKRIDER GRÄNSEN FÖR LASERKLASS 1.



LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

1. GENERAL

1.1 Main features

The d-Copia 12 copier has the following major characteristics:

- **High-speed laser copying**
  - · Since warm-up time is zero, copying can be started immediately after the power switch is turned on.
  - · First-copy time is only 9.6 seconds (normal mode).
  - · Copying speed is 12 copies/min. which adapts to business use, allowing improvement of working efficiency.

- **Digital high-quality image**
  - · High-quality image copying with 600 dpi can be performed.
  - · In addition to the automatic exposure mode, the manual exposure can be adjusted in five steps.
  - · The photo mode copying function which allows clear copying of delicate halftone original images such as monochrome photos and color photos can be used.

- **Substancial copying functions**
  - · Zoom copying from 50% to 200% in 1% increments can be performed.
  - · A maximum of 99 copies can be selected.
  - · Toner save mode for reducing toner consumption by approximately 10% can be set.

- **Environmentally friendly design**
  - · Paper output tray is housed in the copier for space saving.
  - · Preheat mode and auto power shut-off mode are provided to reduce power consumption in standby mode.

- **Printer feature**
  - · This copier is also a laser printer.

1.2 Specifications

1.2.1 Basic specifications of the copier

A. Basic specifications

Item	Spec.
Type	Desktop
Copy system	Dry, electrostatic
Segment (class)	Digital personal copier
External dimensions (W × D × H) (mm)	518 mm × 482.6 mm × 292.6 mm
Weight	Approx. 19Kg, (drum cartridges included)

B. Operation specifications

Section	Item		Details	Spec.
Paper feed setion	Paper feed system			1 tray (250 sheets) + 1 single-sheet manual bypass
	AB system	Tray paper feed section	Paper size	A4, B5, A5 (Landscape)
			Paper weight	56 – 80g/m^2 Tray paper
			Paper feed capacity	250 sheets
			Kinds	Standard paper, specified paper, recycled paper
			Remark	User adjustment of paper guide available
		Single-sheet manual bypass feed section	Paper size	A4, B5, A5, B6, A6 (Landscape)
			Paper weight	52 – 128g/m^2
			Kinds *1	Standard paper, specified paper, recycled paper, OHP, Label, Postal card
			Remark	User adjustment of paper guide available
	Inch system	Tray paper feed section	Paper size	8-1/2″ × 14″, 8-1/2 × 11″, 8-1/2″ × 5-1/2″ (Landscape)
			Paper weight	15 – 21 lbs.
			Paper feed capacity	250 sheets
			Kinds	Standard paper, specified paper, recycled paper
			Remark	User adjustment of paper guide available
		Single-sheet manual bypass feed section	Paper size	8-1/2″ × 14″, 8-1/2 × 11″, 8-1/2″ × 5-1/2″, 3-1/2″ × 5-1/2″ (Landscape)
			Paper weight	14 – 34.5 lbs.
			Kinds *1	Standard paper, specified paper, recycled paper, OHP, Label, Postal card
			Remark	User adjustment of paper guide available

∗1: OHP, Label, Postal card: each 1 pc.

Section		Item	Details	Spec.
Paper exit section		Exit way Capacity of output tray		Face down 100 sheets
Originals		Original set Max. original size Original kinds Original size detection		Center Registration (left edge) B4 (10″ × 14″) sheet None
Optical section	Scanning section	Scanning system CCD sensor Lighting lamp Gradation	 Resolution Type Voltage Power consumption	CCD sensor scanning by lighting lamp scanner 400 dpi Xenon lamp 1.5kV 11 ± 3W 256 gradations/8bit
	Writing section	Writing system Laser unit	 Resolution	Writing to OPC drum by the semiconductor laser 600 dpi
Image forming		Photoconductor Charger Separation system Developing Cleaning	Type Life Charging system Transfer system Developing system Cleaning system	OPC (30ϕ) 18k Saw -tooth charging with a grid, / (–) scorotron discharge (+) DC corotron system (–) DC corotron system Dry, 2-component magnetic brush development system Counter blade system (Counter to rotation)
Fusing section		Fusing system Upper heat roller Lower heat roller Heater lamp	 Type Type Type Voltage Power consumption	Heat roller system Teflon roller Silicon rubber roller Halogen lamp 100V 800W
Electrical section		Power source	Voltage Frequency	Local AC voltage Common use for 50 and 60Hz
		Power consumption	Max. Average (during copying) *1) Average (stand-by) *1) Pre-heat mode *1) Auto power shut-off mode *1)	1000W 310Wh/H 70Wh/H 40Wh/H 18Wh/H

*1) May fluctuate due to environmental conditions and the input voltage.

C. Copy performance

Section	Item	Details	Spec.
Copy magnification	Fixed magnification ratios		3R + 2E (AB system: 50, 70, 81, 100, 141, 200%) (Inch system: 50, 64, 78, 100, 129, 200%)
	Zooming magnification ratios		50 ~ 200% (151 steps in 1% increments)
Manual steps (manual, photo)			5 steps
Copy speed	First copy time	Tray paper feed	9.6 sec. or below (A4), 9.4 sec. or below (8-1/2" × 14") Pre-heat mode: 16 sec. or below / Auto power-shut-off mode: 23 sec. or below)
		Manual paper feed	10.0 sec (Pre-heat mode: 16 sec. or below / Auto power-shut-off mode: 23 sec. or below)
AB system: A4 (Landscape)	Copy speed (CPM)	Same size Enlargement Reduction	12 12 12
B5 (Landscape)	Copy speed (CPM)	Same size Enlargement Reduction	12 12 12
Inch system 8-1/2″ × 14″ (Landscape)	Copy speed (CPM)	Same size Enlargement Reduction	10 10 10
8-1/2″ × 11″ (Landscape)	Copy speed (CPM)	Same size Enlargement Reduction	12 12 12
Max. continuous copy quantity			99
Void	Void area	Leading edge	1 ~ 4mm
		Trailing edge	4mm or less, 6mm or less
		Side edge void area	4.0mm or less (per side), machine with side edge void 0.5mm ~ 4mm (Total of both edge voids)
	Image loss / OC mode	Leading edge	Same size: 3.0mm or less / Enlarge (200%): 2.0mm or less / Reduction (50%): 6.0mm or less
Warm-up time			0 sec.
Power save mode reset time			0 sec.
Paper jam recovery time			0 sec.

1.3 Consumables

1.3.1 Supply system table

No.	Name	Content		Life	Package
1	Toner CA (Black) with CA	Toner (Toner Net Weight 210g) Polyethylene bag	x10 x10	6.5K per unit	1
2	Developer	Developer (Developer Net Weight 170g)	x10	25K per unit	1
3	Drum kit	Drum Drum fixing plate	x1 x1	25K	10

Note: Packed together with the machine: DR 25K/Developer UN/Process UN.

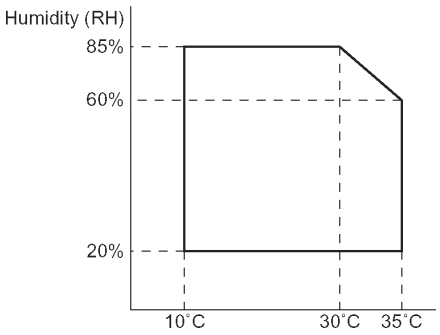
1.4 Environmental conditions

The environmental conditions for assuring the copy quality and the machine operations are as follows:

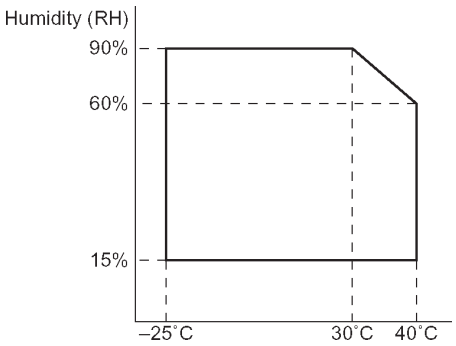
- Normal operating condition

- Temperature:20°C~25
- Humidity:65 ± 5%RH

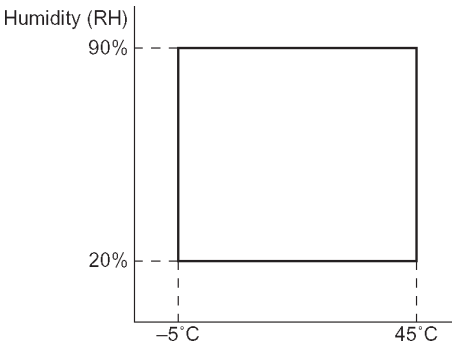
- Acceptable operating condition



- Optical condition

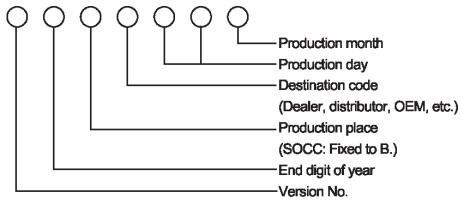


- Supply storage condition



1.5 Production control number (lot No.) identification

(**Developing cartridge**)

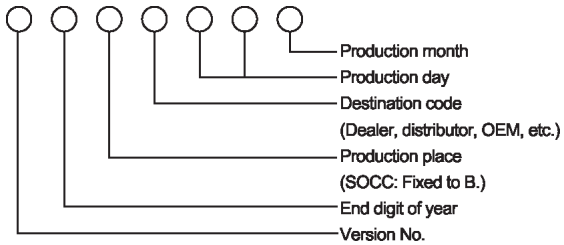


*: Destination

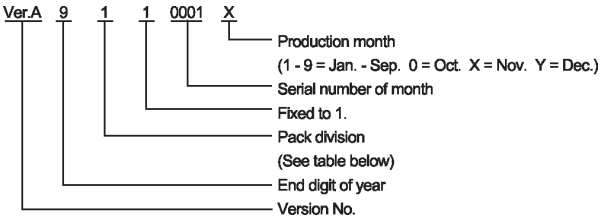
Division		No.
EX Destination	A same pack B same pack	G H
Option Destination	A B	P Q

(**Drum cartridge**)

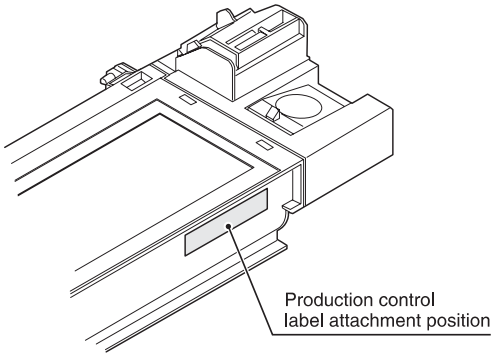
The label on the drum cartridge shows the date of production (SOCC production).

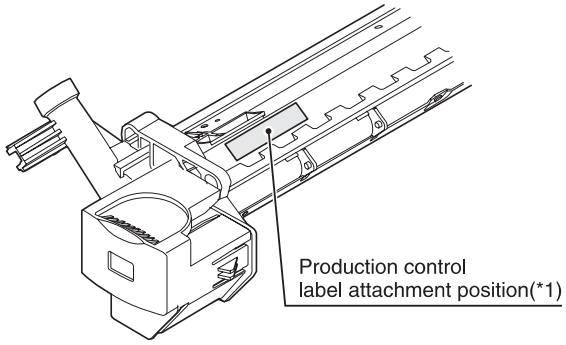


(**JAPAN production)**



Division	No.
Ex production	1
Option	2
Same pack	3

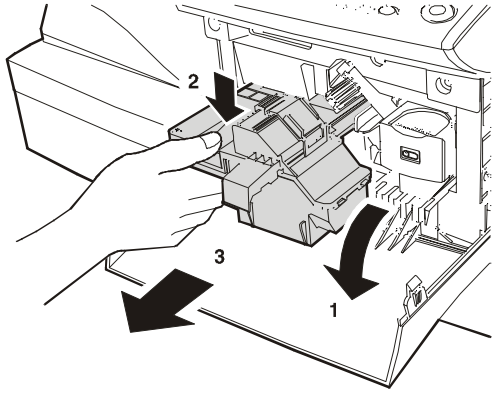




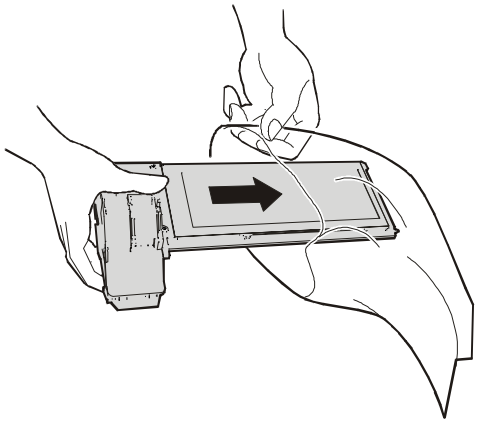
*1 The production control label is not attached to the cartridge of a China product.

1.6 TD cartridge replacement

1) Open the front and side cabinets of the copier.
2) Keep holding Toner lover, and
3) Carefully pull out Toner unit from the copier.



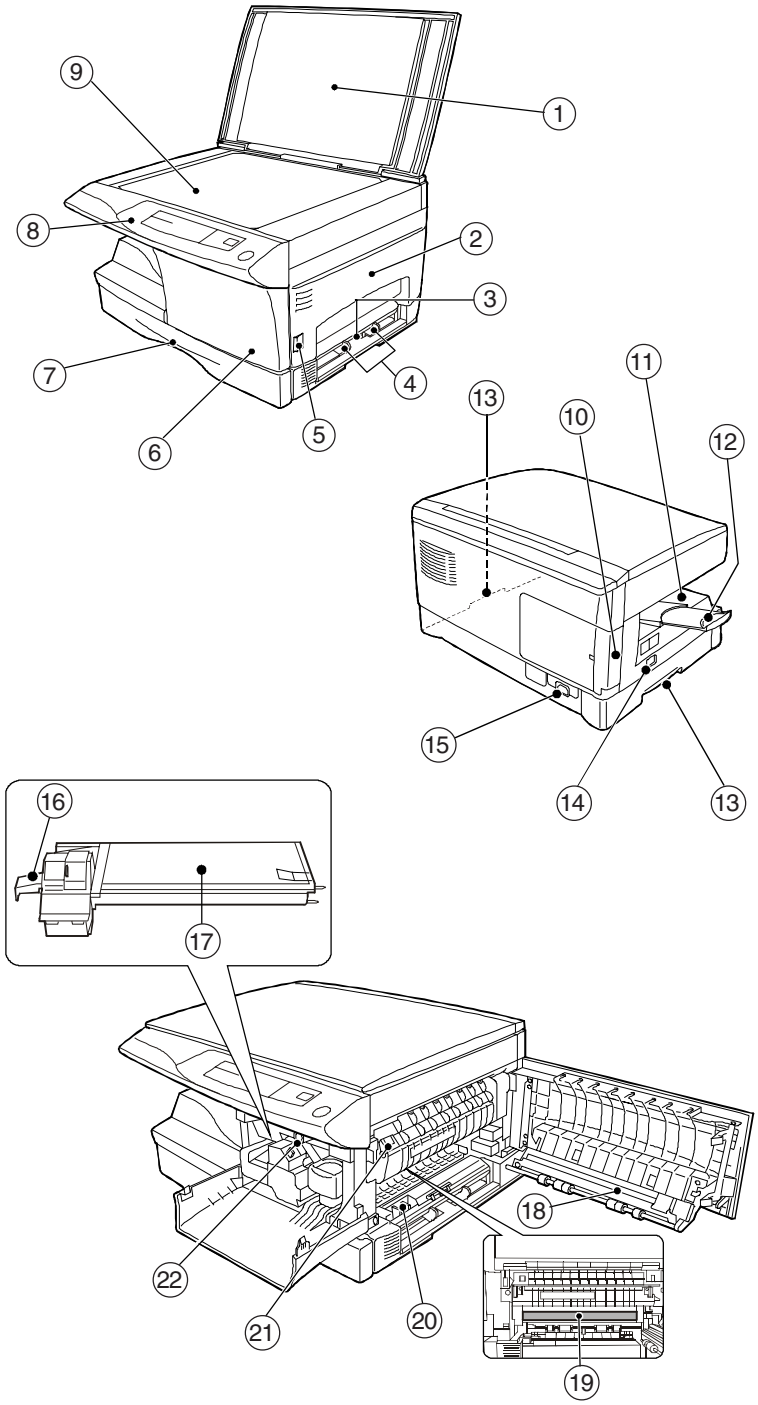
4) Put Toner unit in a collection bag immediately after removing it from the copier.



Note: Never carry exposed Toner unit. Be sure to put it in the collection bag.

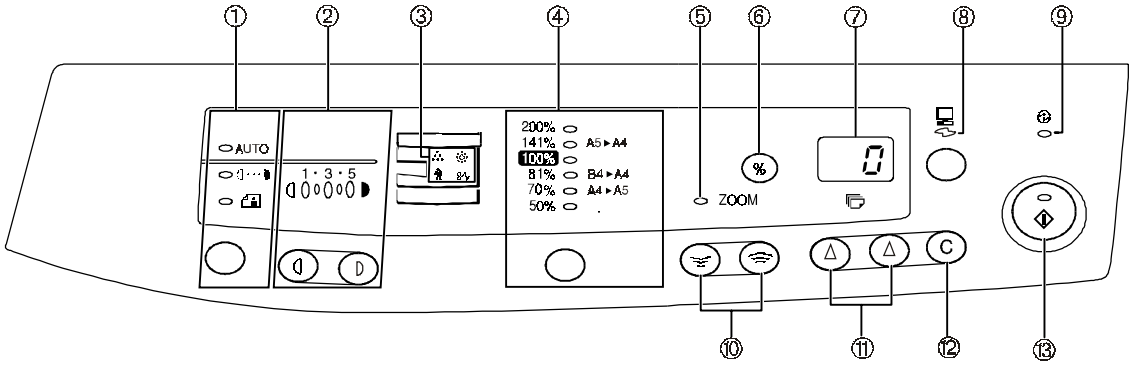
1.7 External views and internal components

1.7.1 General appearance



1 Original cover
2 Side cover
3 Manual bypass
4 Paper guides
5 Side cover open button
6 Front cover
7 Paper tray
8 Operation panel
9 Original table
10 Parallel interface
11 Paper output tray
12 Paper output tray extension
13 Handle
14 Power switch
15 Power cord socket
16 Toner cartridge lock release lever
17 Toner cartridge
18 Transfer charger
19 Photoconductive drum
20 Charger cleaner
21 Fusing unit release tab
22 Paper feed roller

1.8 Operation panel



① **Exposure mode selector key and indicators**
Use to sequentially select the exposure modes: AUTO, MANUAL (◑···◗) or PHOTO (🖻). Selected mode is shown by a lit indicator.

② **Light (◐) and dark (◑) keys and exposure indicators**
Used to adjust the MANUAL (◑···◗) or PHOTO (🖻) exposure level. Selected exposure level is shown by a lit indicator.
Use to start and terminate user program setting.

③ **Alarm indicators**
☼: Developer replacement required indicator.
8/ : Misfeed indicator.
∴: Toner cartridge replacement required indicator.
🚹: Maintenance indicator.

④ **Copy ratio selector key and copy ratio indicators**
Use to sequentially select prset reduction/enlargement copy ratios.

⑤ **Zoom indicator**

⑥ **Copy ratio display (%) key**

⑦ **Display**
Displays the specified copy quantity, zoom copy ratio, user program code, and error code.

⑧ **ON LINE indicator**
Lights up when the machine is used as a printer or when it is receiving or processing print data.

⑨ **Power save indicator**
Lights up when the copier is in a power save mode.

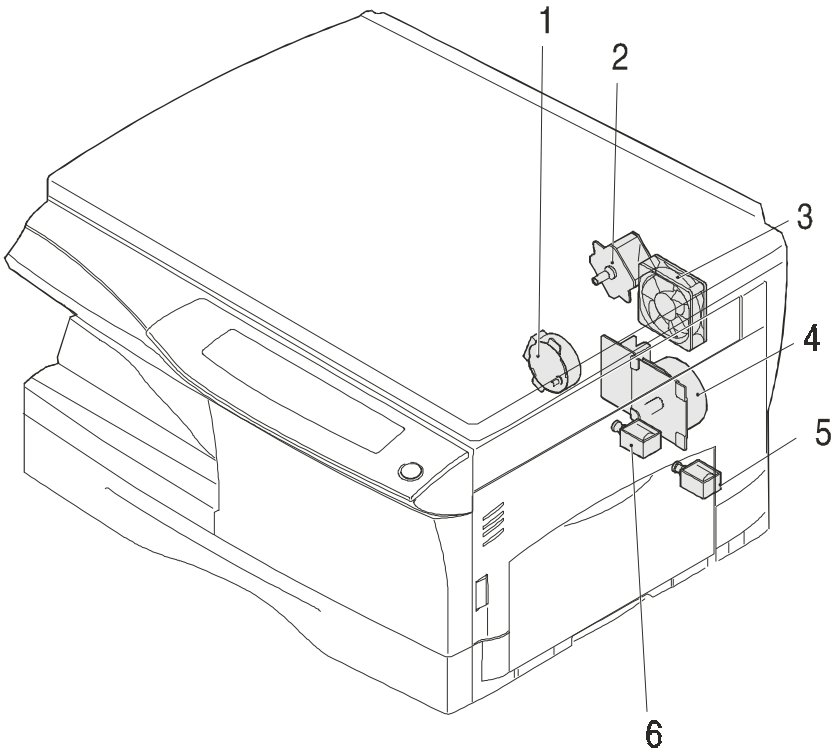
⑩ **Zoom keys (▽, △)**
Use to select any reduction or enlargement copy ratio from 50 to 200% in 1% increments.

⑪ **Copy quantity keys (△, △)**
- Use to select the desired copy quantity (1 to 99).
- Use to make user program entries.

⑫ **Clear key (C)**
- Press to clear the display, or press during a copy run to terminate copying.
- Press and hold down during standby to display the total number of copies to date.

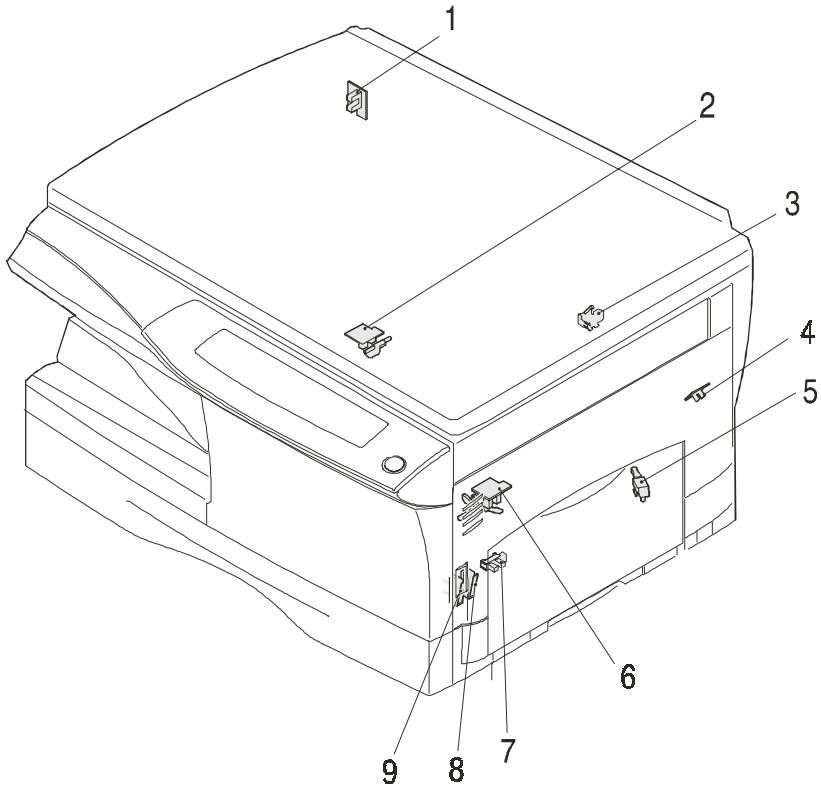
⑬ **Print key and ready indicator (◈)**
- Copying is possible when the indicator is on.
- Use to set a user program.

1.9 Motors and solenoids



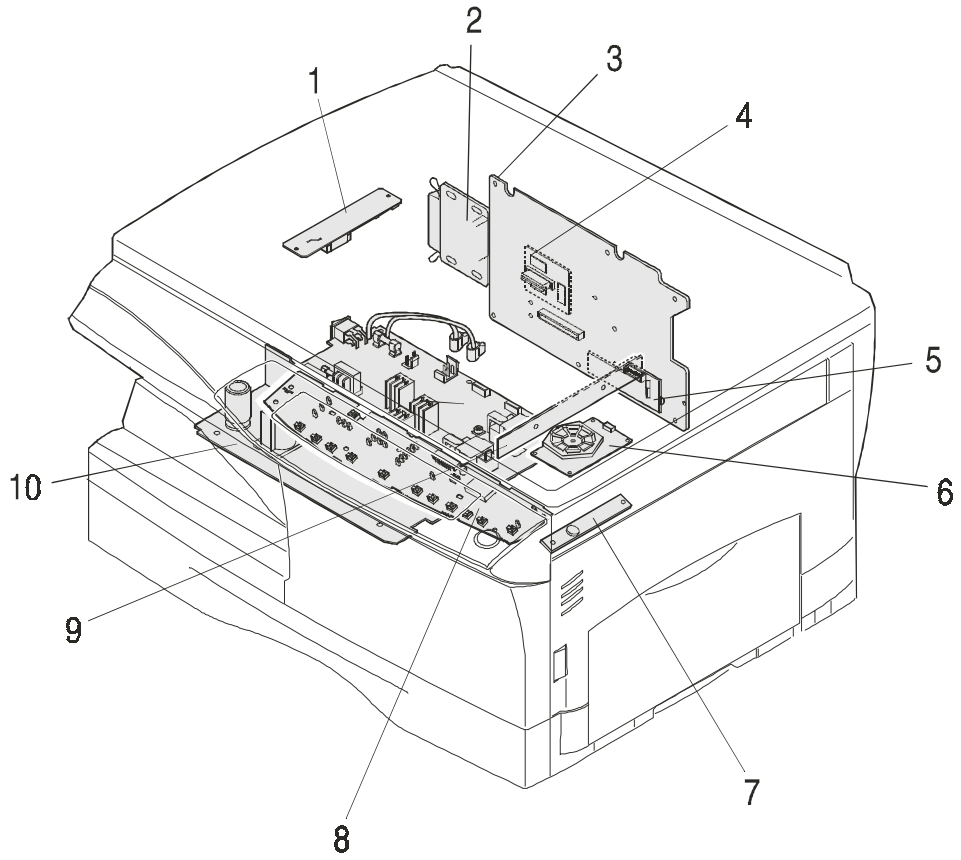
No.	Part name	Control signal	Function operation
1	Toner motor	TM	Supplies toner
2	Mirror motor	MRMT	Drives the optical mirror base (scanner unit)
3	Cooling fan motor	VFM	Cools the optical section
4	Main motor	MM	Drives the copier
5	Resist roller solenoid	RRS	Resist roller rotation control solenoid
6	Paper feed solenoid	CPFS1	Cassette paper feed solenoid 1

1.10 Sensors and switches



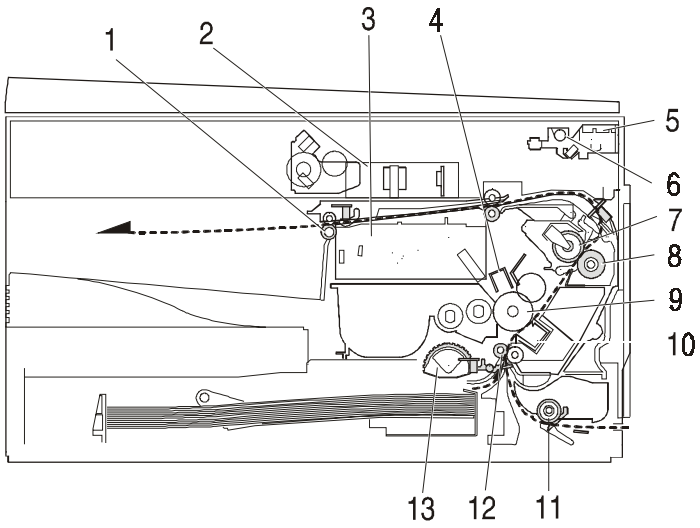
No.	Name	Signal	Type	Function	Output
1	Mirror home position sensor	MHPS	Transmission sensor	Mirror (scanner unit) home pos. detection	“H” at home pos.
2	POD sensor	POD	Transmission sensor	Paper exit detection	“H” at paper pass
3	SPPD sensor	SPPD	Transmission sensor	Paper transport detection	“L” at paper pass
4	PPD2 sensor	PPD2	Transmission sensor	Paper transp. detection 2	“L” at paper pass
5	Cassette detect. switch	CED1	Microswitch	Cassette installation installation	“H” at cass. insert.
6	PPD1 sensor	PPD1	Transmission sensor	Paper transp. detection 1	“L” at paper pass
7	PPD3 sensor	PPD3	Transmission sensor	Paper transp. detection 3	“L” at paper pass
8	Door switch	DSW	Microswitch	Door open/close detect. (safety switch for 5V)	1 or 0V or 5V at door open
9	Door switch	DSW	Microswitch	Door open/close detect. (safety switch for 24V)	1 or 0V or 24Vat door open

1.11 PWB unit



No.	Name	Function
1	Exposure lamp invertor PWB	Exposure lamp (Xenon lamp) control
2	GDI PWB	For GDI interface
3	Main PWB (MCU)	Copier control
4	Memory PWB 4MB	For memorizing data
5	LSU PWB	For laser control
6	LSU motor PWB	For polygon motor drive
7	TCS PWB	For toner sensor control
8	Operation PWB	Operation input/display
9	CCD sensor PWB	For image scanning
10	Power PWB	AC power input, DC voltage control, High voltage control

1.12 Cross sectional view



No.	Part name	Function and operation
1	Paper exit roller	Roller for paper exit
2	Lens unit	Scans the original image with the lens and the CCD
3	LSU (Laser unit)	Converts the original image signal into laser beams and writes onto the drum
4	Main charger	Provides negative charges evenly to the drum surface
5	Scanner unit	Illuminates the original with the copy lamp and passes the reflected light to the ens unit (CCD)
6	Exposure lamp	Exposure lamp (Xenon lamp) Illuminates original
7	Heat roller	Fuses toner on the paper (Teflon roller)
8	Pressure roller	Fuses toner on the paper (Silicon rubber roller)
9	Drum	Forms images
10	Transfer unit	Transfers images onto the drum.
11	Manual paper feed roller	Transport the paper from the manual paper feed port
12	PS roller unit	Takes synchronization between the lead edge and the rear edge of the paper
13	Paper feed roller	Picks up a sheet of paper from the cassette

■

2. UNPACKING AND INSTALLATION

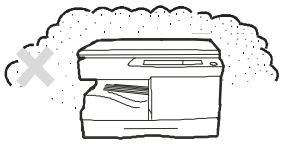
2.1 Copier installation

Improper installation may damage the copier. Please note the following during initial installation and whenever the copier is moved.

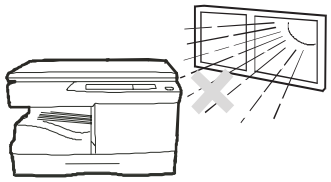
Caution: If the copier is moved from a cool place to a warm place, condensation may form inside the copier. Operation in this condition will cause poor copy quality and malfunctions. Leave the copier at room temperature for at least 2 hours before use.

Do not install your copier in areas that are:

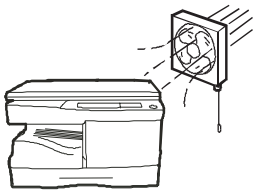
- damp, humid, or very dusty



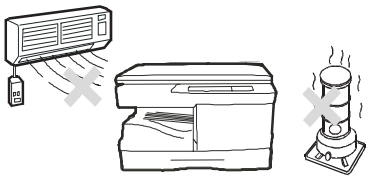
- exposed to direct sunlight



- poorly ventilated

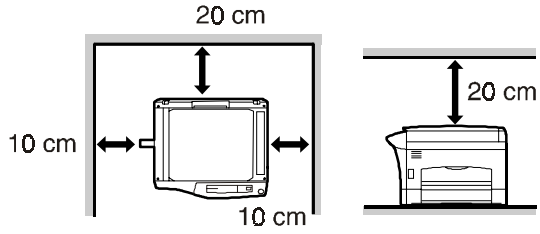


- subject to extreme temperature or humidity changes, e.g., near an air conditioner or heater.



The copier should be installed near an accessible power outlet for easy connection. Be sure to connect the power cord only to a power outlet that meets the specified voltage and current requirements. Also make certain the outlet is properly grounded.

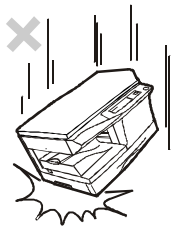
Be sure to allow the required space around the machine for servicing and proper ventilation.



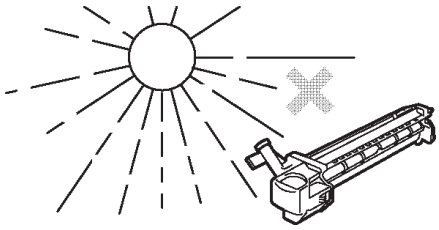
2.2 Cautions on handling

Be careful in handling the copier as follows to maintain the performance of this copier.

Do not drop the copier, subject it to shock or strike it against any object.



Do not expose the drum cartridge to direct sunlight.
Doing so will damage the surface (green portion) of the drum cartridge, causing poor print quality.



Store spare supplies such as drum cartridges and TD cartridges in a dark place without removing from the package before use.

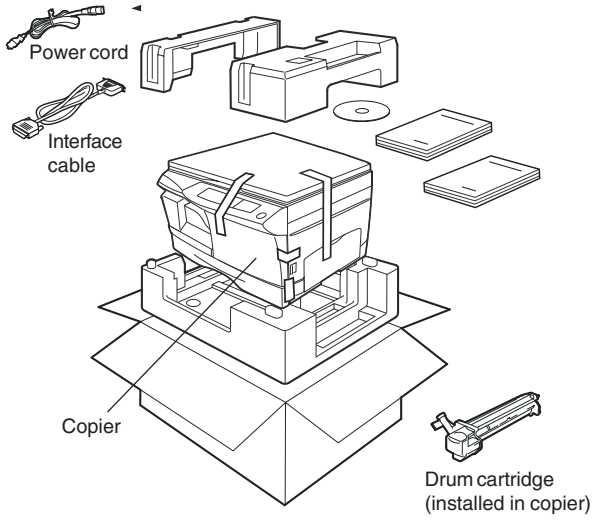
If they are exposed to direct sunlight, poor print quality may result.

Do not touch the surface (green portion) of the drum cartridge.

Doing so will damage the surface of the cartridge, causing poor print quality.

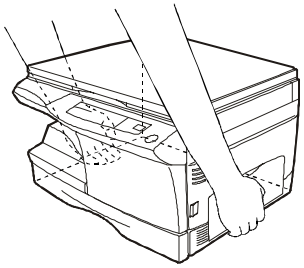
2.3 Checking packed components and accessories

Open the carton and check if the following components and accessories are included.



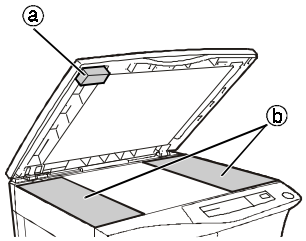
2.4 Unpacking

Be sure to hold the handles on both sides of the copier to unpack the copier and carry it to the installation location.

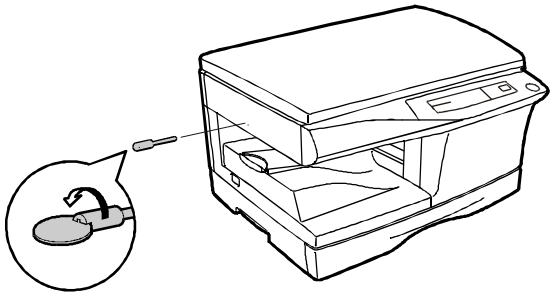


2.5 Removing protective packing materials

1) Remove pieces of tape and protective cover. Then open the original cover and remove protective materials (a) and (b).

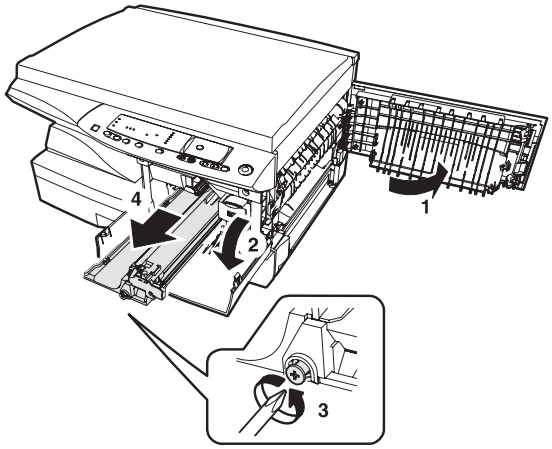


2) Use a coin (or suitable object) to remove the screw. Store the screw in the paper tray because it will be used if the copier has to be moved.

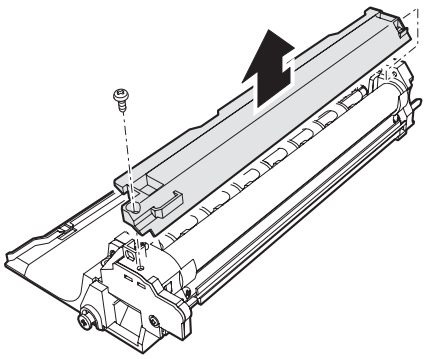


2.6 Developer unit installation

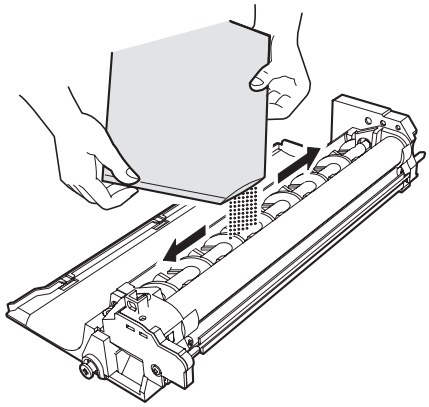
1) 2) 3) Open the side and front cabinets of the copier.
4) Remove the locking tape of the developer unit.
5) Remove the screw which is fixing the copier and Developer unit.
6) Remove Developer unit slowly from the copier.



7) Remove the screw (1 pc).
8) Remove Upper developer unit.



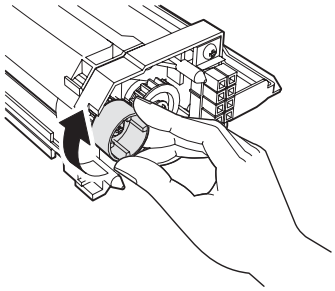
9) Shake the aluminum bag to stir developer.
10) Supply developer from the aluminum bag to the top of the MX roller evenly.



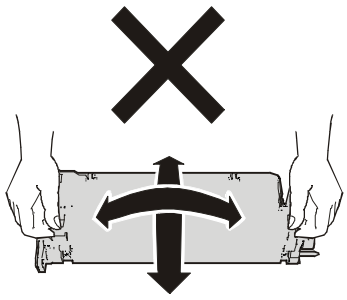
Note: Be careful not to splash developer outside Developer unit.

11) Attach Upper developer unit and fix it with a screw.

12) Rotate the MG roller gear to distribute developer evenly.



Note: Never rotate the gear in the reverse direction.
Note: When carrying Developer unit, do not tilt it extremely as shown with the arrow in the figure below. (Prevention of splash of developer)



13) Insert Developer unit carefully into the copier.

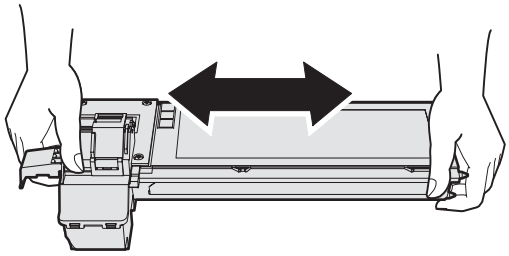
Note: Quick insertion may result in splash of developer. Be sure to insert carefully.

14) Confirm that Developer unit is completely inserted to the bottom of the machine, fix Developer unit and the machine with a screw.

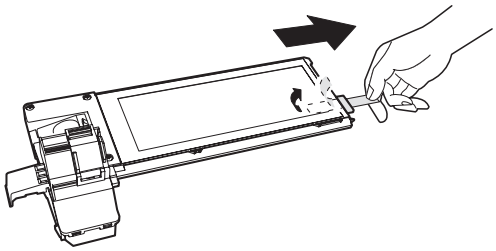
15) Completion of Developer unit installation.

2.7 Toner cartridge installation

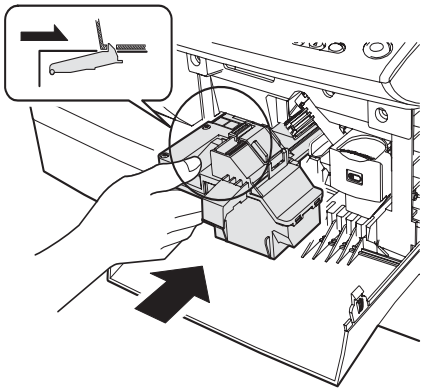
1) To prevent against uneven distribution of toner, hold Toner unit with both hands and shake it several times horizontally.



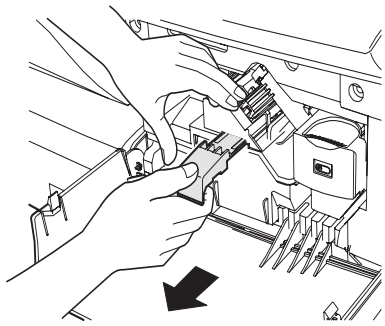
2) Hold the section of Toner unit shown in the figure below, remove the packing tape, and remove the cushion.
3) Pull out the cushion in the arrow direction.



4) Insert Toner unit carefully into the copier.
5) Insert until the hook is engaged with the copier as shown in the figure below.



6) Pull out the shutter in the arrow direction.

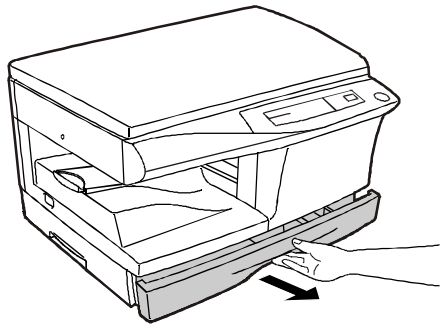


Note: Do not hold and carry the shutter. Otherwise the shutter may drop and Toner unit may drop.

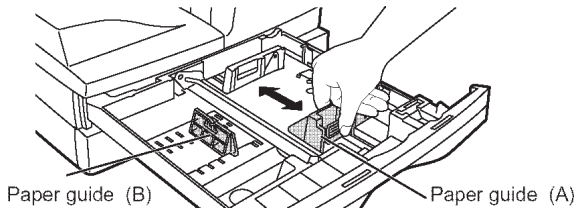
7) Completion of Toner unit installation
Close the front and side cabinets.

2.8 Loading copy paper

1) Raise the handle of the paper tray and pull the paper tray out until it stops.

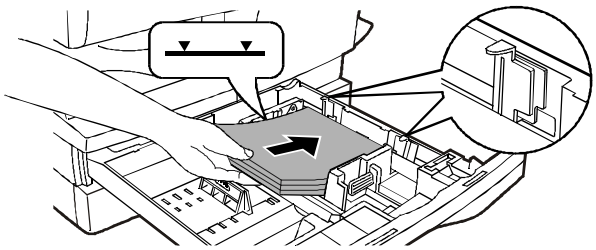


2) Remove the pressure plate lock. Rotate the pressure plate lock to remove it while pressing down the pressure plate of the paper tray.
3) Store the pressure plate lock which has been removed in step 2 and the screw which has been removed when unpacking (see REMOVING PROTECTIVE PACKING MATERIALS) in the front of the paper tray.
To store the pressure plate lock, rotate the lock to fix it on the relevant location.
4) Adjust the paper guides on the paper tray to the copy paper width and length.
Squeeze the lever of paper guide (A) and slide the guide to match with the width of the paper.
Move paper guide (B) to the appropriate slot as marked on the tray.



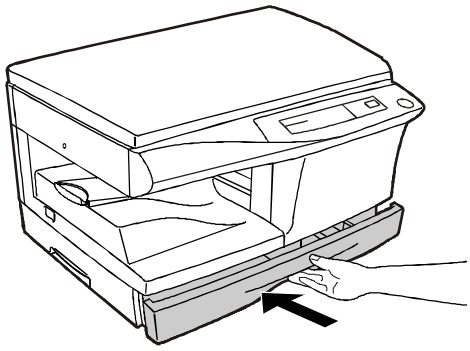
5) Fan the copy paper and insert it into the tray. Make sure the edges go under the corner hooks.

Note: Do not load paper above the maximum height line (▼ ▼). Exceeding the line will cause a paper misfeed.



6) Gently push the paper tray back into the copier.

Note: After loading copy paper, to cancel the blinking "P" without restarting copying, press the clear (ⓒ) key. The "P" in the display will go out and the ready (⍟) indicator will light up.



2.9 Power to copier

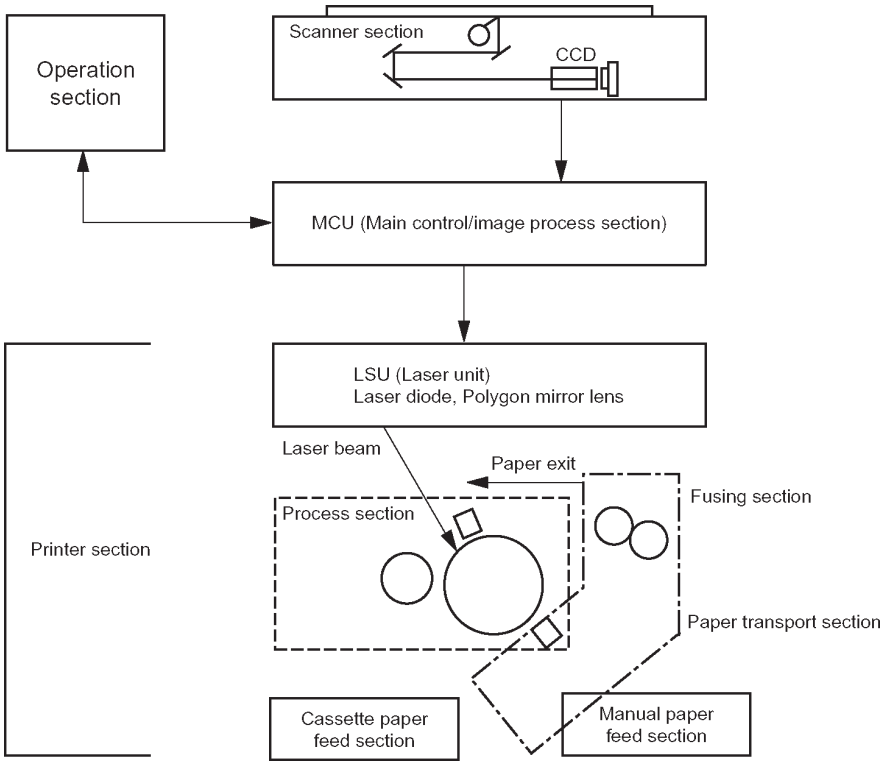
1) Ensure that the power switch of the copier is in the OFF position. Insert the attached power cord into the power cord socket at the rear of the copier.
2) Plug the other end of the power cord into the nearest outlet.

■

3. OPERATIONAL DESCRIPTIONS

3.1 Outline of operation

The outline of operation is described referring to the basic configuration.



Outline of copy operation

Setting conditions

1) Set copy conditions such as the copy quantity and the copy density with the operation section, and press the COPY button. The information on copy conditions is sent to the MCU.

Image scanning

2) When the COPY button is pressed, the scanner section starts scanning of images. The light from the copy lamp is reflected by the document and passed through the lens to the CCD.

Photo signal/Electric signal conversion

3) The image is converted into electrical signals by the CCD circuit and passed to the MCU.

Image process

4) The document image signal sent from the CCD circuit is processed under the revised conditions and sent to the LSU (laser unit) as print data.

Electric signal/Photo signal (laser beam) conversion

5) The LSU emits laser beams according to the print data. (Electrical signals are converted into photo signals.)
6) The laser beams are radiated through the polygon mirror and various lenses to the OPC drum.

Printing

7) Electrostatic latent images are formed on the OPC drum according to the laser beams, and the latent images are developed to be visible images (toner images).
8) Meanwhile the paper is fed to the image transfer section in synchronization with the image lead edge.
9) After the transfer of toner images onto the paper, the toner images are fused to the paper by the fusing section. The copied paper is discharged onto the exit tray.

3.2 Scanner section

3.2.1 How to scan documents

The scanner has sensors that are arranged in a line. These sensors scan a certain area of a document at a time and deliver outputs sequentially. When the line is finished, the next line is scanned, and this procedure is repeated.

The figure on the side shows the case where the latter two sections of an image which are scanned are shown with solid lines and the former two sections which are being transmitted are shown with dotted lines.

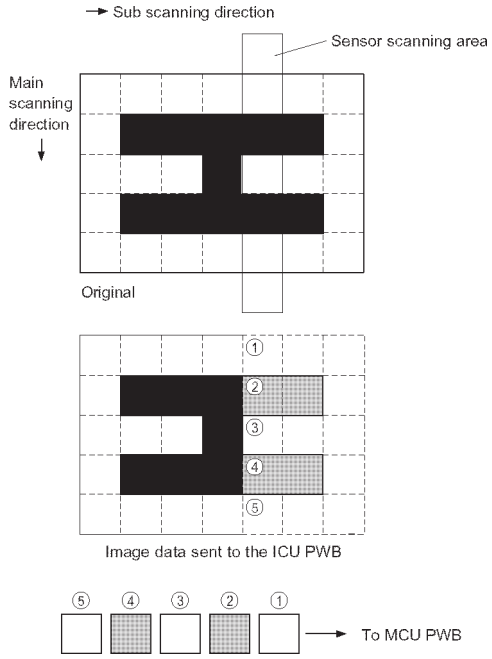
The direction of this line is called “main scanning direction,” and the scanning direction “sub scanning direction.”

With reference to the figure, one line is divided into 4 sections. Actually, however, one line is divided into thousands of sections. For scanning, the light receiving element called CCD is used.

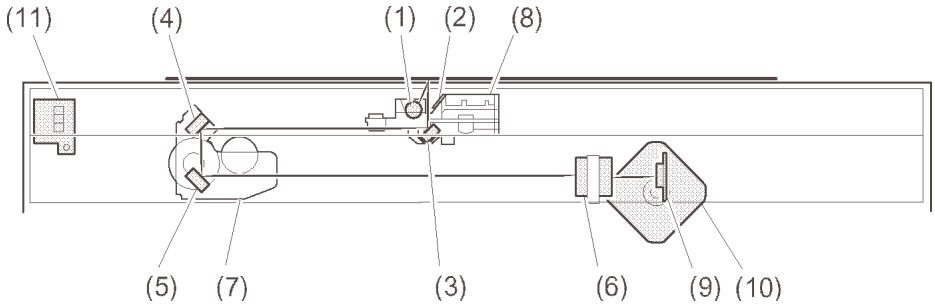
The basic resolution indicates the scanner capacity. The basic resolution is expressed in dpi (dot/inch) which shows the number of light emitting elements per inch on the document.

The basic resolution of this machine is 400dpi.

In the sub scanning direction, at the same time, the motor that drives the optical system is controlled to scan the image at the basic resolution.



3.2.2 Basic structure of scanner section



1	Copy lamp (Xenon lamp)	2	Reflector (light conversion plate)	3	No. 1 mirror
4	No. 2 mirror	5	No. 3 mirror	6	Lens
7	No. 2/3 mirror unit	8	Copy lamp unit	9	CCD
10	Mirror motor	11	MHPS (Mirror home position sensor)		

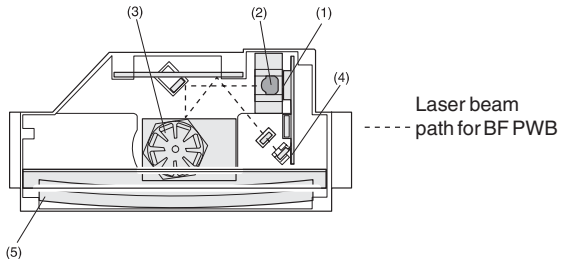
The scanner unit performs scanning in the digital optical system. The light from the light source (Xenon lamp) is reflected by a document and passed through three mirrors and reduction lenses to the CCD element (image sensor) where images are formed. This system is known as the reduction image sensor system. Photo energy on the CCD element is converted into electrical signals (analog signals). (Photo-electric conversion). The output signals (analog signals) are converted into digital signals (A/D conversion) and passed to the MCU (main control/image process section). The resolution at that time is 400dpi. The mirror unit in the scanner section is driven by the mirror motor. The MHPS is provided to detect the home position of the copy lamp unit.

3.3 Laser unit

The image data sent from the MCU (image process circuit) is sent to the LSU (laser unit), where it is converted into laser beams.

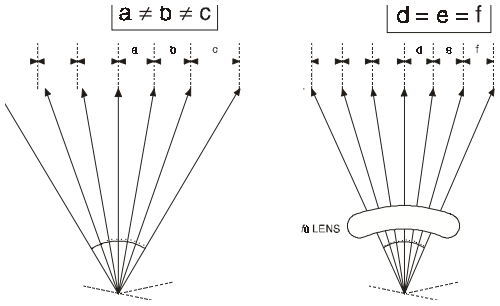
3.3.1 Basic structure

The LSU unit is the writing section of the digital optical system. The semiconductor laser is used as the light source, and images are formed on the OPC drum by the polygon mirror and fθ lens, etc. The laser beams are passed through the collimator lens, the cylindrical lens, the polygon mirror, the fθ lens, and the mirror to form images on the OPC drum in the main scanning direction. The laser emitting PWB is provided with the APC (auto power control) in order to eliminate fluctuations in the laser power. The BF PWB works for measurement of the laser writing start point.

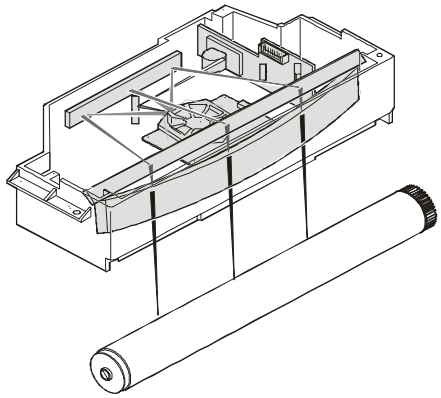


No.	Component	Function
(1)	Semiconductor laser	Generates laser beams.
(2)	Collimator lens	Converges laser beams in parallel.
(3)	Polygon mirror, polygon motor	Reflects laser beams at a constant rpm.
(4)	BD (Mirror, lens, PWB)	Detects start timing of laser scanning.
(5)	fθ lens	Converges laser beams at a spot on the drum. Makes the laser scanning speeds at both ends of the drum same as each other (refer to the figure below).

Makes the laser scanning speeds at both ends of the drum same as each other.



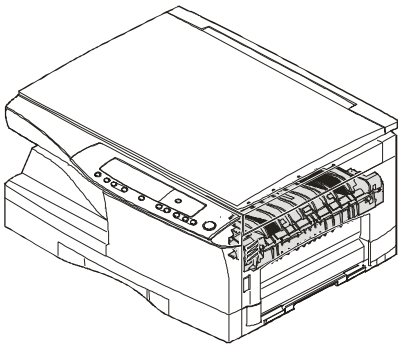
3.3.2 Laser beam path



3.3.3 Composition

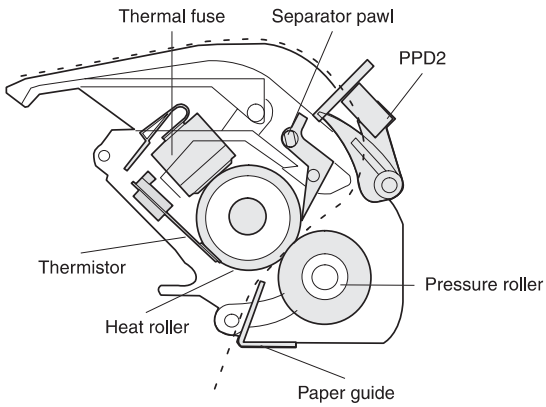
Effective scanning width:	216mm (max.)
Resolution:	600dpi
Beam diameter:	75um in the main scanning direction, 80um in the sub scanning direction
Image surface power:	0.20 ±0.03mW (Laser wavelength780 – 795nm)
Polygon motor section:	Brushless motor 20.787rpm No. of mirror surfaces: 6 surfaces

3.4 Fuser section

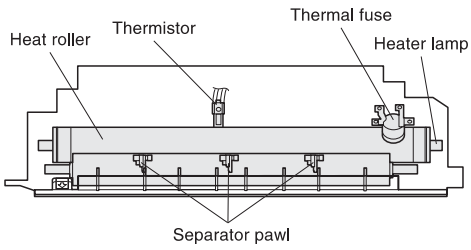


3.4.1 General description

General block diagram (cross section)



Top view



(1) Heat roller

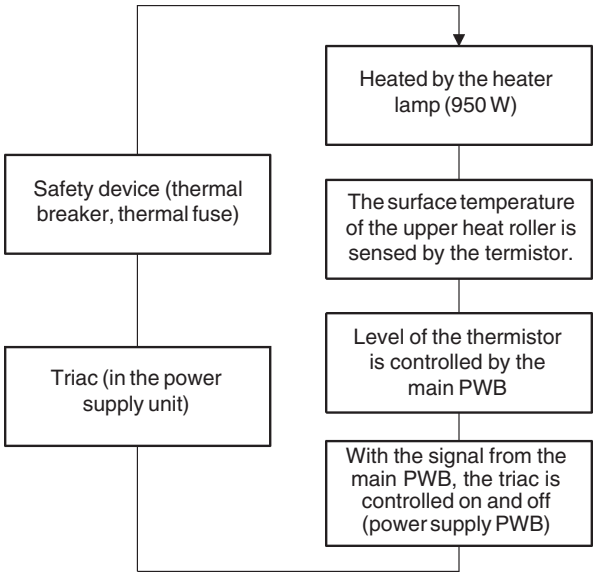
A Teflon roller is used for the heat roller and a silicone rubber roller is used for the lower heat roller for better toner fusing performance and paper separation.

(2) Separator pawl

Three separator pawls are used on the upper heat roller. The separator pawls are teflon coated to reduce friction with the roller and prevent a smear on the paper caused by the separator pawl.

(3) Thermal control

1. The heater lamp, thermistor, main PWB, DC power supply PWB, and triac within the power supply unit are used to control the temperature in the fuser unit.
   To prevent against abnormally high temperature in the fuser unit, a thermal breaker and thermal fuse are used for safety purposes.



2. The surface temperature of the upper heat roller is set to 165°C ~ 190°C. The surface temperature during the power save mode is set to 100°C.

3. The self-check function comes active when one of the following malfunctions occurs, and an "H" is displayed on the multicopy window.
   a. When the heat roller surface temperature rises above 240°C.
   b. When the heat roller surface temperature drops below 100°C during the copy cycle.
   c. Open thermistor
   d. Open thermal fuse
   e. When the heat roller temperature does not reach 190°C within 27 second after supplying the power.

(4) Fusing resistor

Fusing resistor

This model is provided with a fusing resistor in the fusing section to improve transfer efficiency.

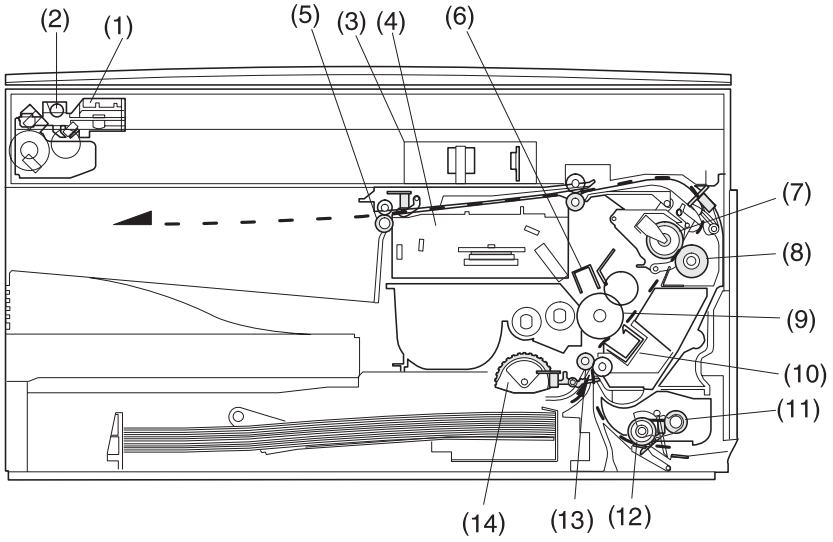
General descriptions are made in the following.

General descriptions

Since the upper heat roller is conductive when copy paper is highly moist and the distance between the transfer unit and the fusing unit is short, the transfer current leaks through the copy paper, the upper heat roller and the discharging brush.

3.5 Paper feed section and paper transport section

3.5.1 Paper transport path and general operations

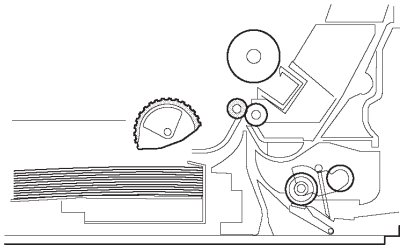


(1)	Scanner unit	(6)	Main charger	(11)	Pickup roller
(2)	Copy lamp	(7)	Heat roller	(12)	Manual paper feed roller
(3)	Lens unit	(8)	Pressure roller	(13)	PS roller unit
(4)	LSU (Laser unit)	(9)	Drum	(14)	Paper feed roller
(5)	Paper exit roller	(10)	Transfer unit		

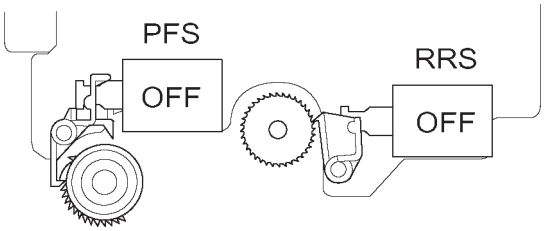
Paper feed is made in two ways; the cassette paper feed and the manual paper feed. The cassette is of universal-type, and has the capacity of 250 sheets.

3.5.2 Cassette paper feed operation

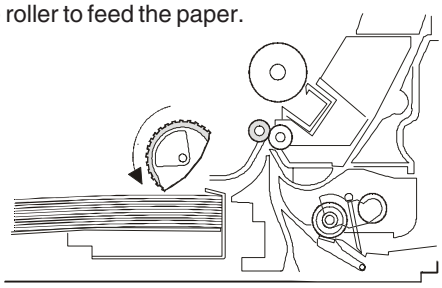
1) The figure below shows the positions of the pick-up roller, the paperfeed clutch sleeve, and the paper feed latch in the initial state without pressing the COPY button after lighting the ready lamp. The paper feed latch is in contact with the projection of the clutch sleeve.

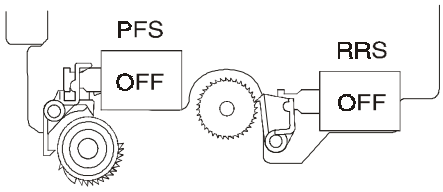


2) When the COPY button is pressed, the main drive motor starts rotating to drive each drive gear. The pick-up drive gear also is driven at that time. Since, however, the paper feed latch is in contact with the projection of the clutch sleeve, rotation of the drive gear is not transmitted to the pick-up roller, which does not rotate.



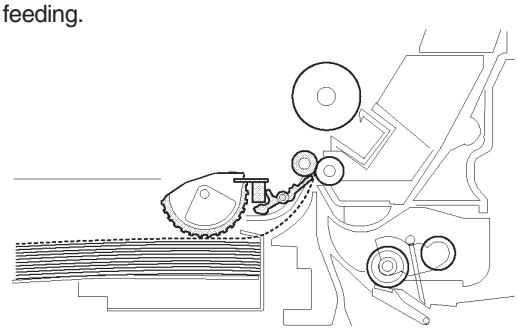
3) After about 0.1 sec from when the main motor starts rotating, the tray paper feed solenoid (PFS) turns on momentarily.
This disengages the paper feed latch from the projection of the clutch sleeve, transmitting rotation of the pick-up drive gear to the paper feed roller shaft, rotating the pick-up roller to feed the paper.

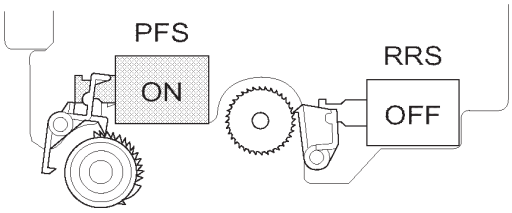




4) After more than half rotation of the pick-up roller, the paper feed latch is brought in contact with the projection of the clutch sleeve, stopping rotation of the pick-up roller.

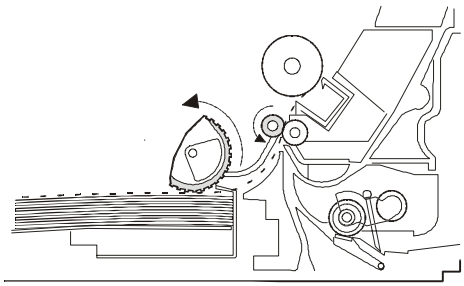
5) At this time, the paper is fed past the paper entry detection switch (PPD1), and detected by it. After about 0.15 sec from detection of paper by PPD1, the tray paper feed solenoid (PFS) turns on so that the clutch sleeve projection comes into contact with the paper feed latch to stop the pick-up roller. Then the pick-up roller rotates for about 0.15 sec so that the lead edge of the paper is evenly pressed on the resist roller, preventing against skew feeding.

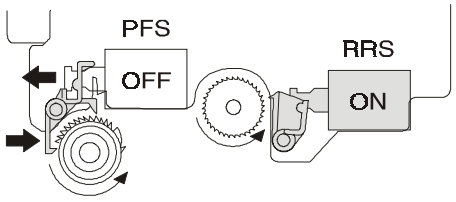




6) To release the resist roller, the tray paper feed solenoid and the resist solenoid are turned on by the paper start signal to disengage the resist start latch from the clutch sleeve projection, transmitting rotation of the resist drive gear to the resist roller shaft. Thus the paper is transported by the resist roller.

7) After the resist roller starts rotating, the paper is passed through the pre-transfer guide to the transfer section. Images are transferred on the paper, which is separated from the OPC drum by the drum curve and the separation section.





8) The paper separated from the drum is passed through the fusing paper guide, the heat roller (fusing section), POD (paper out detector) to the copy tray.

■

4. DISASSEMBLY AND ASSEMBLY

Before disassembly, be sure to disconnect the power cord for safety.
The disassembly and assembly procedures are described for the followingn sections:
1. High voltage section
2. Operation panel section
3. Optical section
4. Fusing section
5. Cassette paper feed/transport section
6. Manual paper feed section
7. Rear frame section
8. Power section

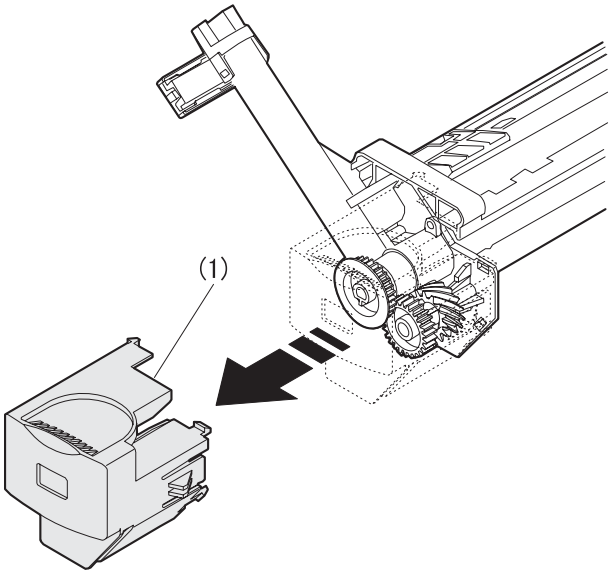
4.1 High voltage section

4.1.1 List of parts

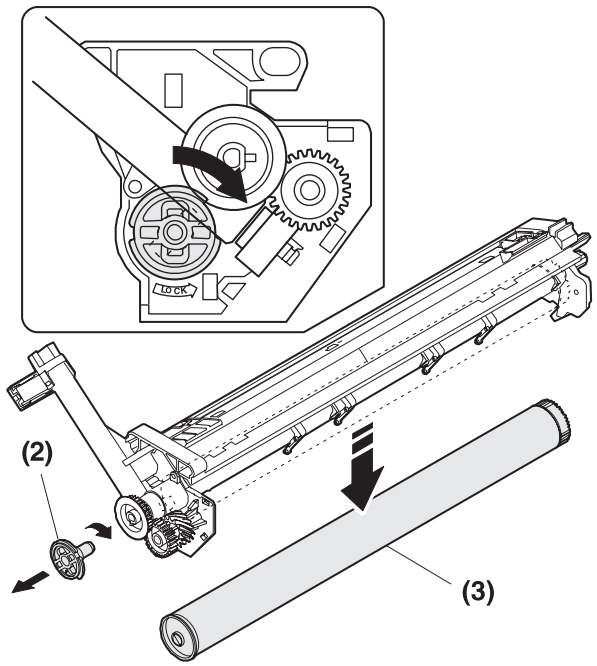
No.	Part name Ref.
1	Drum
2	Transfer charger unit
3	Charger wire

4.1.2 Drum replacement

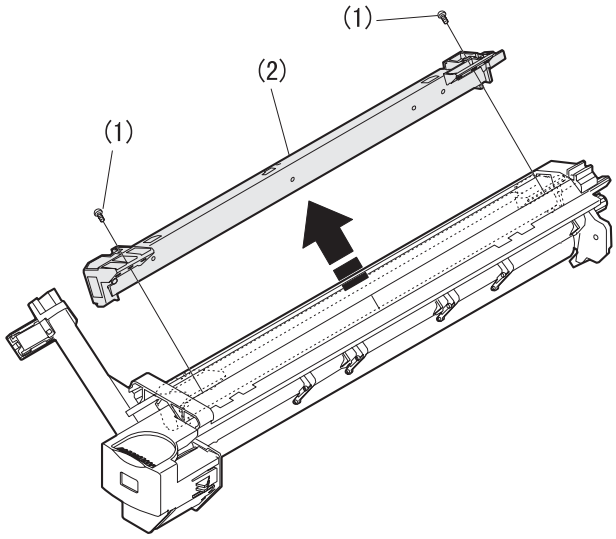
1) Remove the drum cover. (4 Lock Tabs)



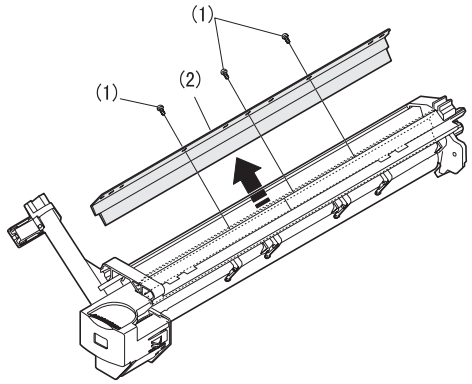
2) Remove the drum fixing plate and the photoconductor drum.
Note: Dispose the drum fixing plate which was removed.



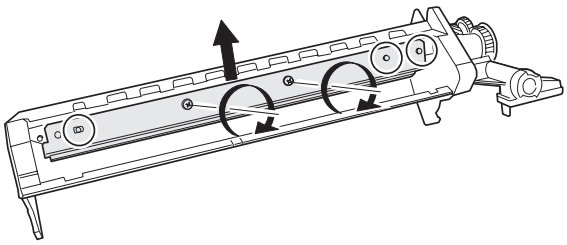
3) Check the cleaning blade and the red felt for no damage.
• If there is any damage, execute all procedures from item 5) and later.
• If there is no damage, execute the procedure of item 12).
4) Remove the main charger.
(Cleaning the screen grid and the sawteeth.)



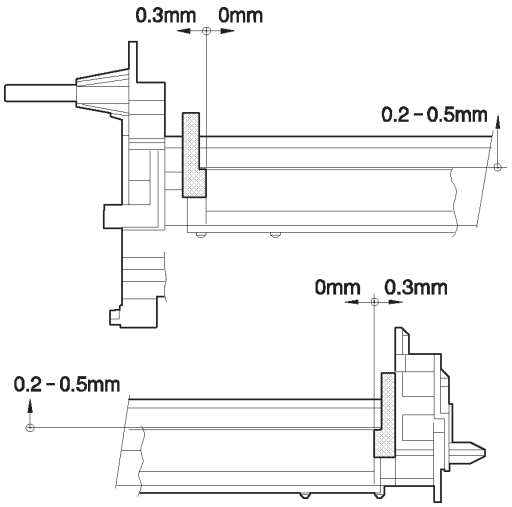
5) Remove the cleaning blade.
Note: Dispose the cleaning blade which was removed.



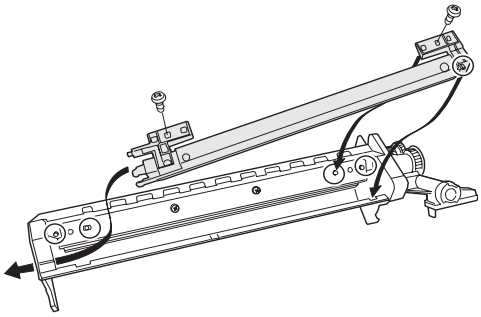
6) Clean the cleaning section and the waste toner pipe to remove waste toner completely with a vacuum cleaner.
7) Remove the felt and duplex tape completely.
Note: Be careful not to scratch or bend the sub blade.
8) Attach the cleaning blade.
Securely insert the plate section of the cleaning blade into the unit and fix it with a screw.
Do not touch the cleaning blade rubber with your hand.
When attaching the cleaning blade, press the cleaning blade in the arrow direction and attach.



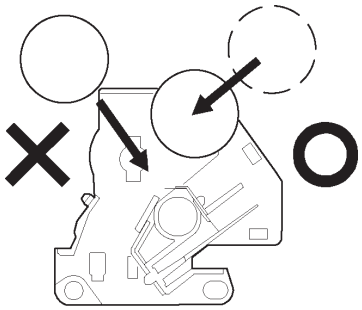
9) Attach the felt.

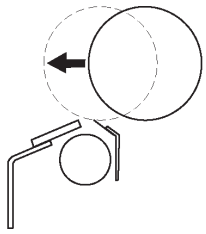


Attach the mocket with slightly pressing the cleaning blade.
Do not touch the tip of the cleaning blade.
Do not put the mocket under the cleaning blade.
Do not put the mocket on the sub blade.
Do not press the sub blade with the mocket.
10) Attach the main charger.
Securely set the MC holder on the projection of the process frame.
Securely insert two projections of the MC holder into the groove in the process frame.
When attaching the MC holder ass'y, be careful not to make contact with the cleaning blade.



11) Attach the drum fixing plate and the photoconductor drum.
Apply grease to the inside of the photoconductor drum.



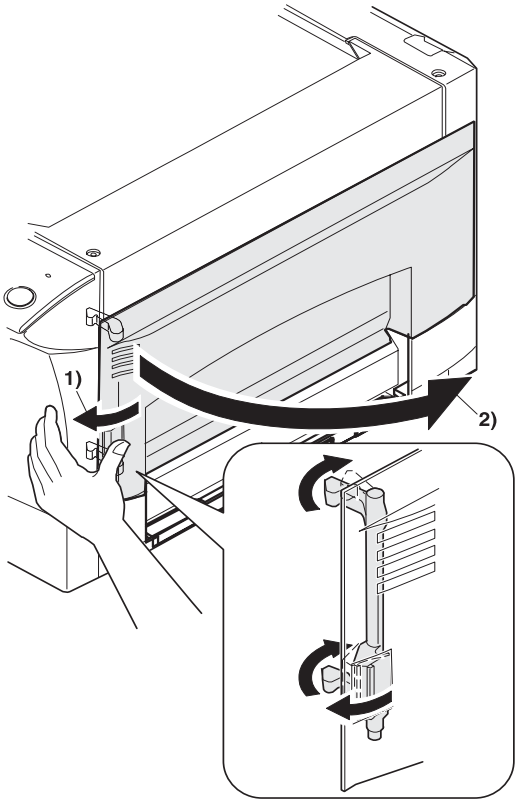


Attach the drum. (Prevention against the sub blade edge breakage)
Attach the drum so that its position with the sub blade is as shown.

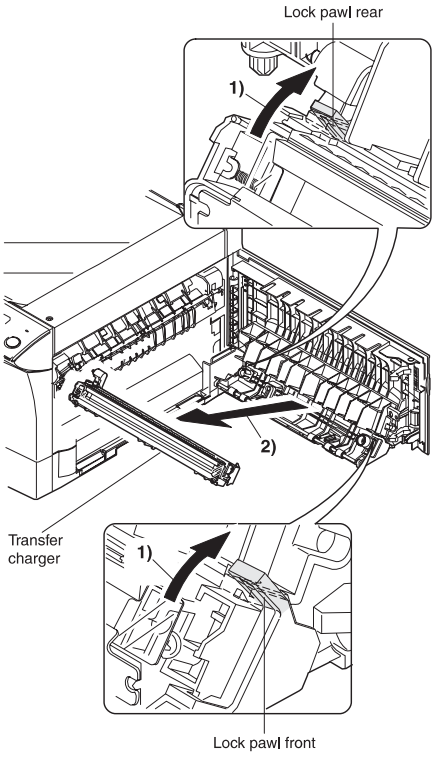
12) Attach the drum cover.

4.1.3 Disassembly procedure

(1) Press the side cover open/close button and open the side cover.



(2) Push up the lock pawls (2 positions) of the side cover, and remove the transfer charger.

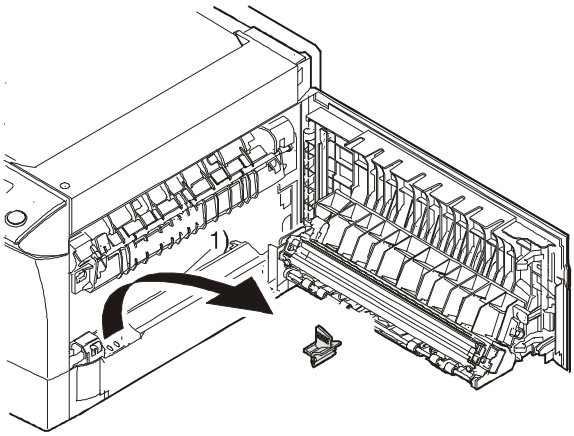


4.1.4 Assembly procedure

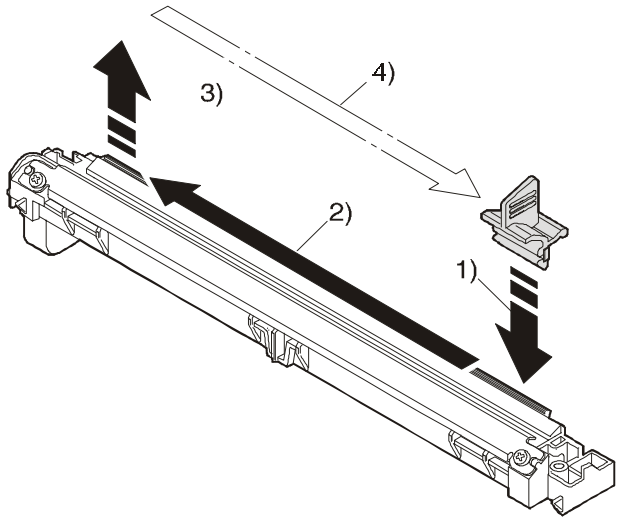
For assembly, reverse the disassembly procedure.

4.1.5 Charger wire cleaning

(1) Remove the charger cleaner from the manual paper feed unit.

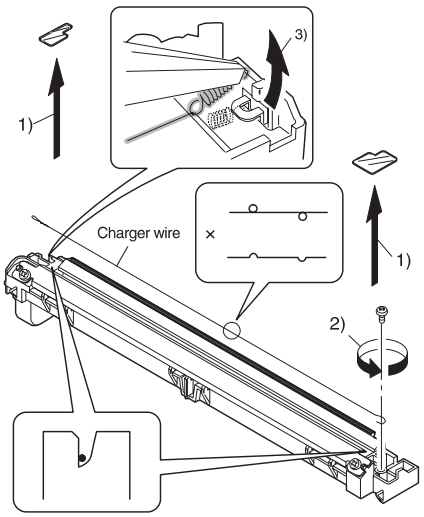


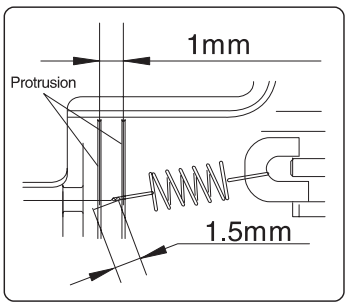
(2) Set the charger cleaner to the transfer unit, and move it reciprocally a few times in the arrow direction shown in the figure below.



4.1.6 Charger wire replacement

(1) Remove the TC cover and remove the screw.
(2) Remove the spring and remove the charger wire.
(3) Install a new charger wire by reversing the procedures (1) and (2).
At that time, be careful of the following items.
- The rest of the charger wire must be within 1.5mm.
- The spring hook section (charger wire winding section) must be in the range of the projection section.
- Be careful not to twist the charger wire.





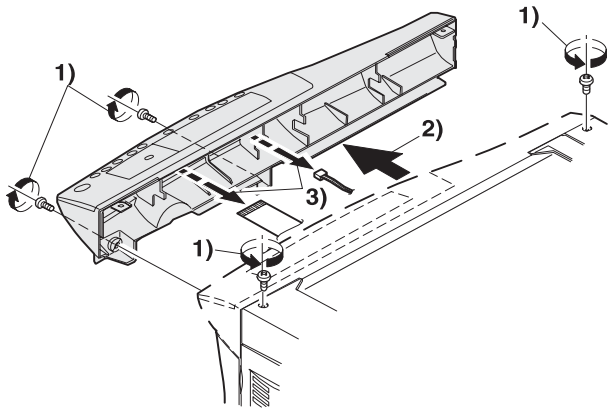
4.2 Operation panel section

4.2.1 List of parts

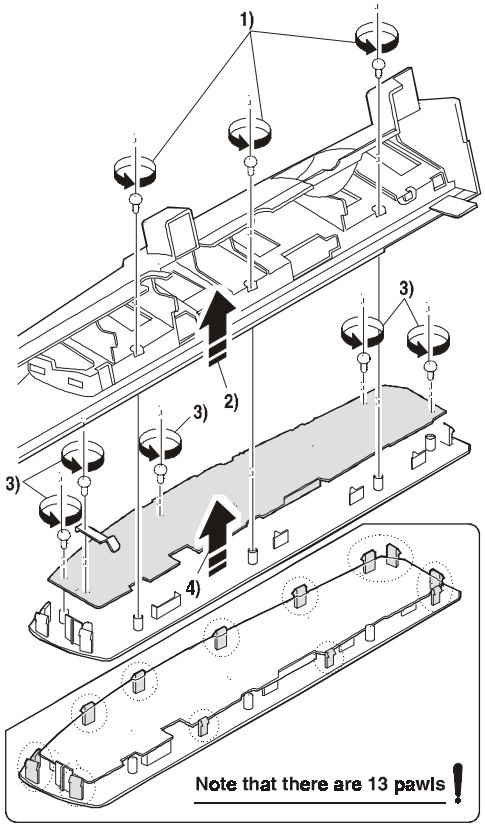
No.	Part name Ref.
1	Operation panel unit
2	Operation PWB

4.2.2 Disassembly procedure

(1) Remove the screws (4 pcs.), the harness, and the operation panel unit.



(2) Remove the screws (3 pcs.) and the PWB holder.
(3) Remove the screws (3 pcs.) and the operation PWB.



4.2.3 Assembly procedure

For assembly, reverse the disassembly procedure.

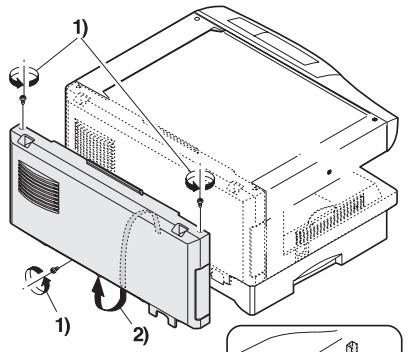
4.3 Optical section

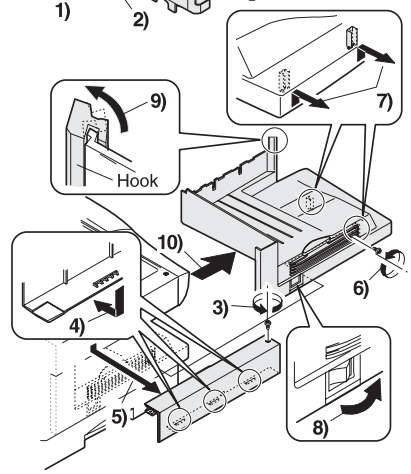
4.3.1 List of parts

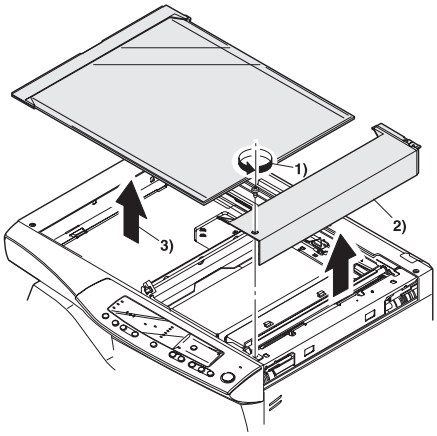
No.	Part name Ref.
1	Copy lamp unit
2	Copy lamp
3	Lens unit

4.3.2 Disassembly procedure

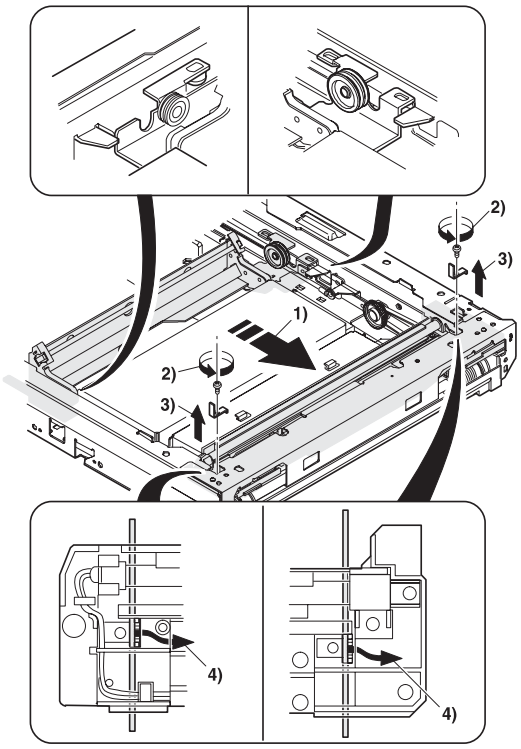
(1) Remove the parts as shown below.



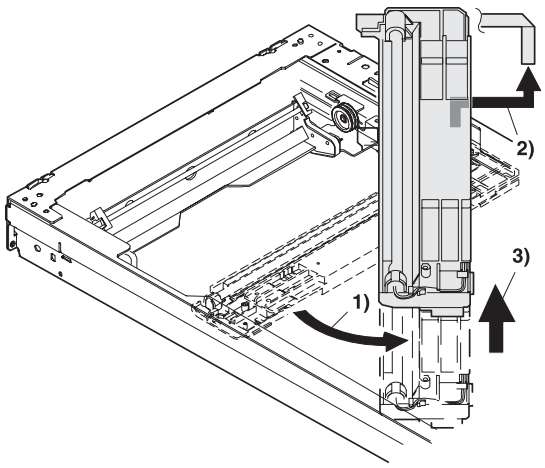




(2) Remove the screws (2pcs.), and remove the copy lamp unit from the mirror base drive wire.

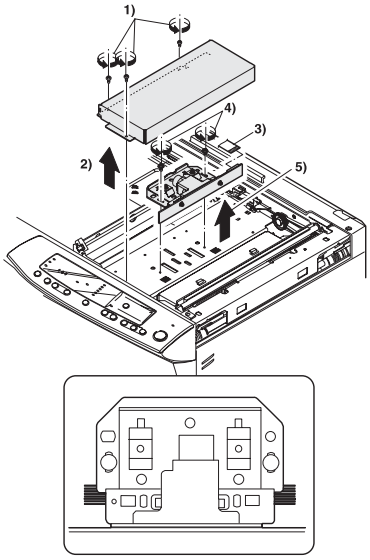


(3) Pull the copy lamp unit toward you to remove the harness.



(4) Remove the screw (4 pc) and remove the cover.

(5) Remove the screws (2 pcs.), the harness, and the optical unit.

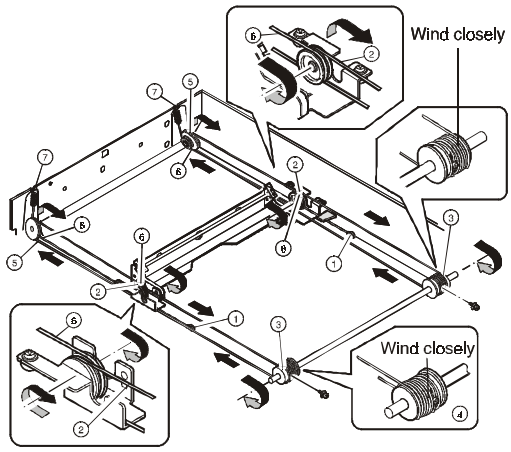


When installing the lens unit, refer to “Lens unit installation reference” in the next chapter.

4.3.3 Assembly procedure

Basically reverse the disassembly procedure.
The mirror base drive wire and the lens drive wire stretching methods are described below.

a. Mirror base drive wire stretching
   1. Hook the metal fixture of the mirror base drive wire on the projection of the optical base plate.
   2. Pass the wire through the external groove of the double pulley. (At that time, check that No. 2/3 mirror unit is in contact with the mirror base positioning plate.)
3. Hold so that the winding pulley groove is up, and wind the mirror base drive wire 9 turns.
4. Put the 8th turn of the mirror base drive wire in the winding pulley groove and fix with a screw.
5. Pass the wire under No. 2/3 mirror unit plate and wind it around the pulley.
6. Pass the wire through the internal groove of the double pulley and pass through the pulley.
7. Hook the spring hook on the optical base plate.



After installing the mirror base drive wire, be sure to perform main scanning direction image distortion adjustment.

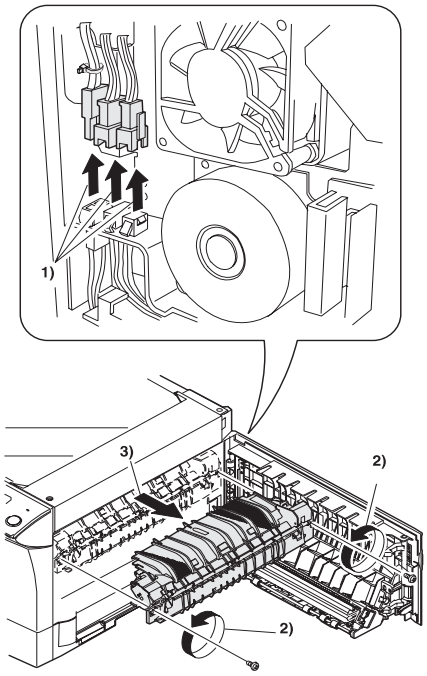
4.4 Fusing section

4.4.1 List of parts

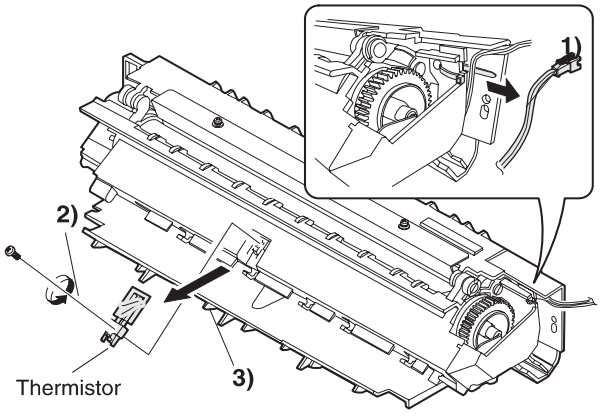
No.	Part name Ref.
1	Thermistor
2	PPD2 sensor
3	Heater lamp
4	Pressure roller
5	Heat roller

4.4.2 Disassembly procedure

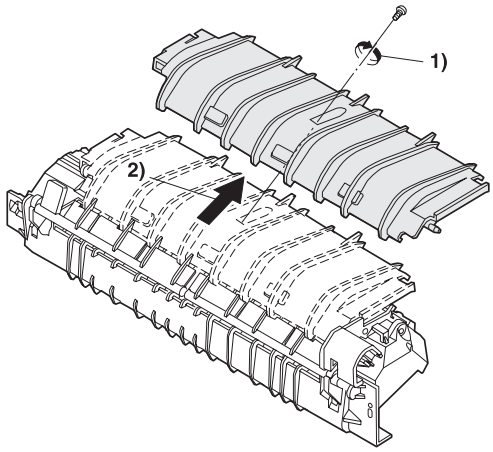
(1) Remove the connectors (3 pcs.) of the rear cabinet.
(2) Open the side cover, remove two screws, and remove the fusing unit.



(3) Cut the binding band, remove the screw, and remove the thermistor.

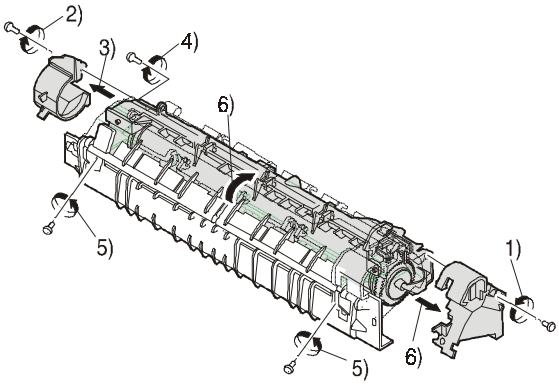


(4) Remove the screw and remove the U-turn guide.

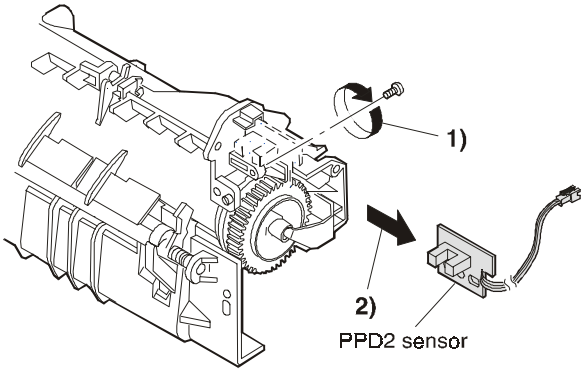


4.4.2.1 Pressure roller section disassembly

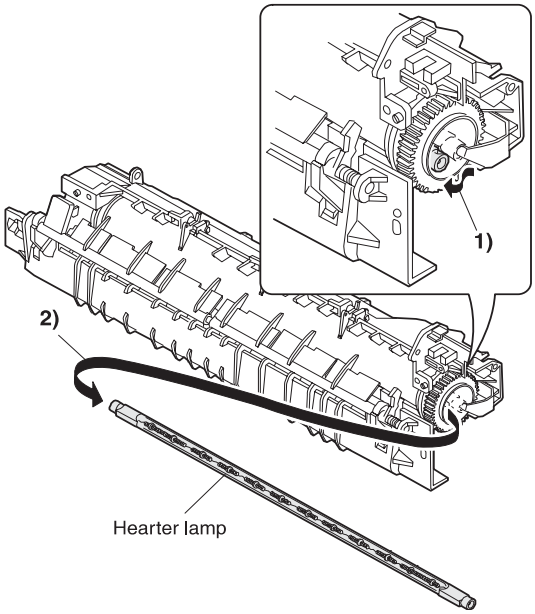
(5) Remove the three screws, remove the fusing cover lower on the right side, and open the heat roller section.



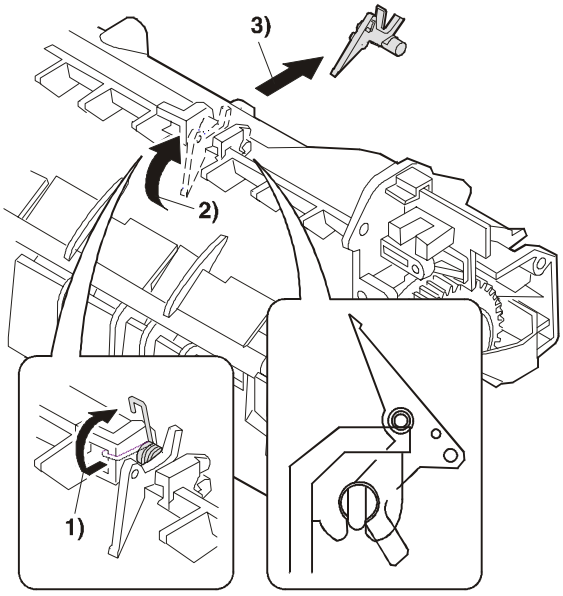
(6) Remove the screw and remove the PPD2 sensor.



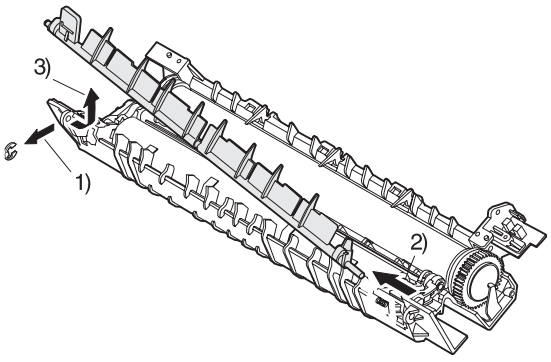
(7) Remove the plate spring on the right and remove the heater lamp.



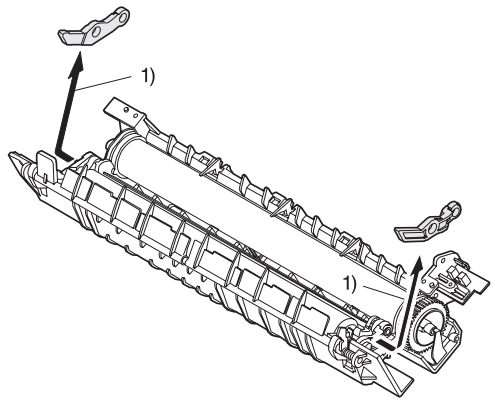
(8) Remove the spring and remove the separation pawls (3 pcs).



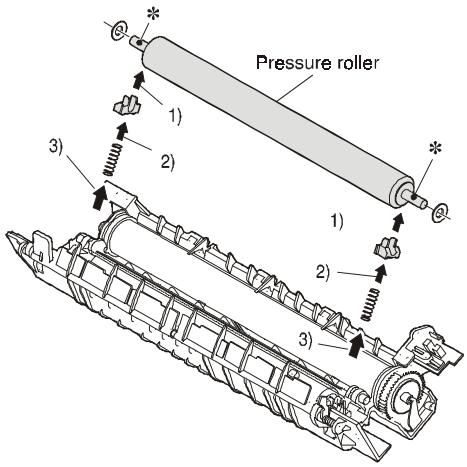
(9) Remove the E-ring and remove the reverse gate.



(10) Remove the pressure release levers on the right and the left sides.



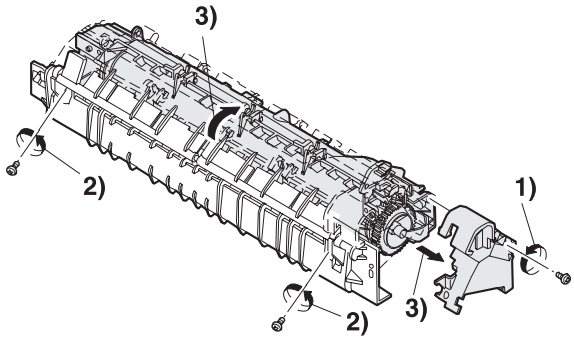
(11) Remove the pressure roller, the pressure bearing, and the spring.
Note: Apply grease to the sections specified with ✻ .



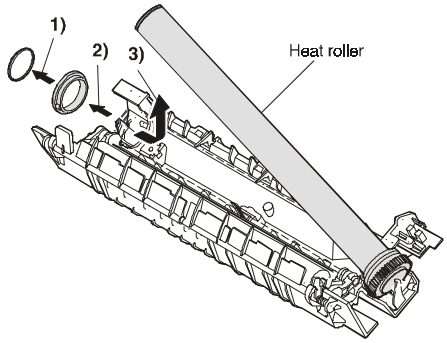
4.4.2.2 Heat roller disassembly

Continued from procedure (4).

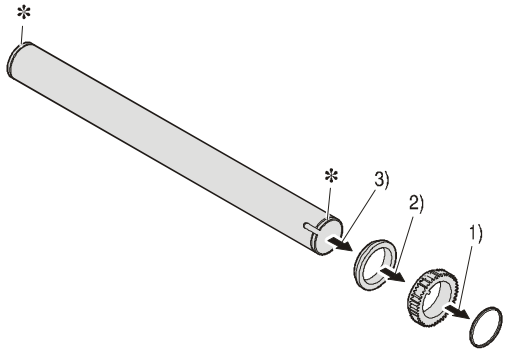
(5) Remove screws, remove the fusing cover, and open the heat roller section.



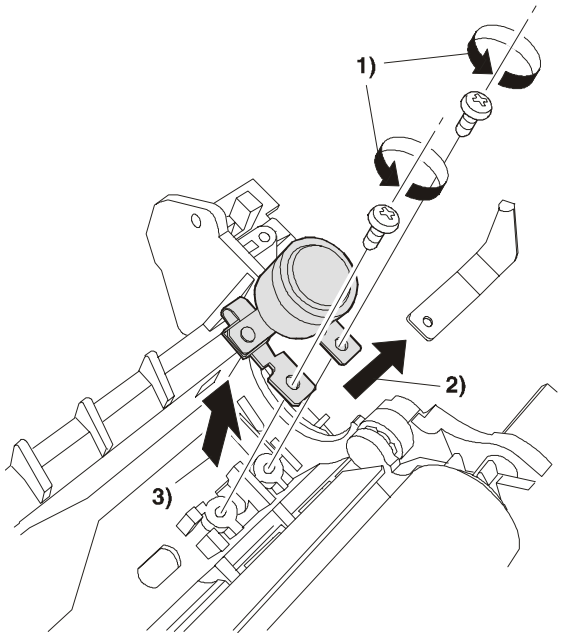
(6) Remove the C-ring and the fusing bearing, and remove the heat roller.



(7) Remove the parts from the heat roller.
Note: Apply grease to the sections specified with ✻ .



(8) Remove two screws and remove the thermostat.



4.4.3 Assembly procedure

For assembly, reverse the disassembly procedure.

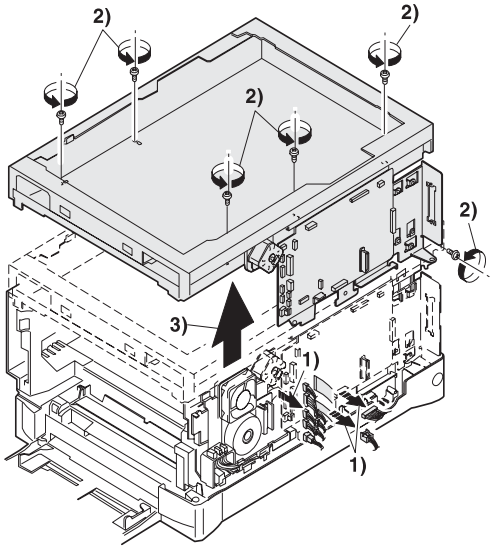
4.5 Cassette paper feed/transport section

4.5.1 List of parts

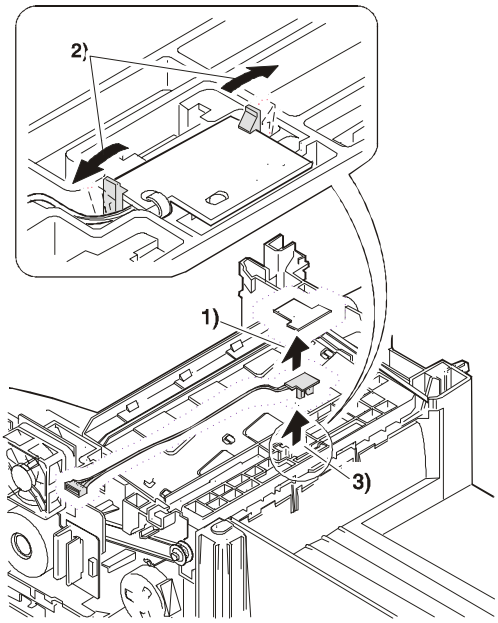
No.	Part name Ref.
1	PPD1 sensor PWB
2	LSU unit
3	Intermediate frame unit
4	Paper feed roller

4.5.2 Disassembly procedure

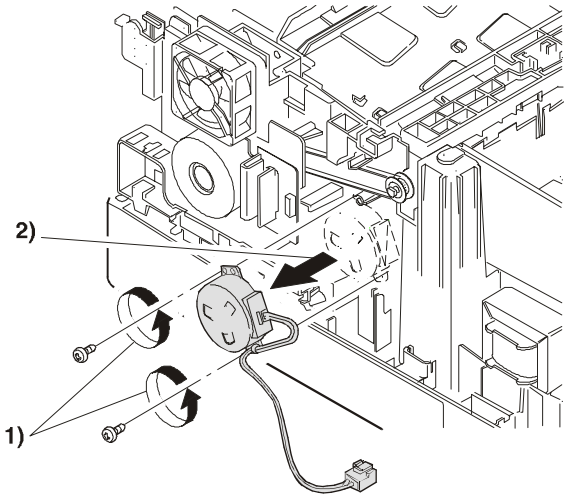
(1) Remove six connectors and screws of the main PWB, and lift the optical unit and the main PWB to remove.



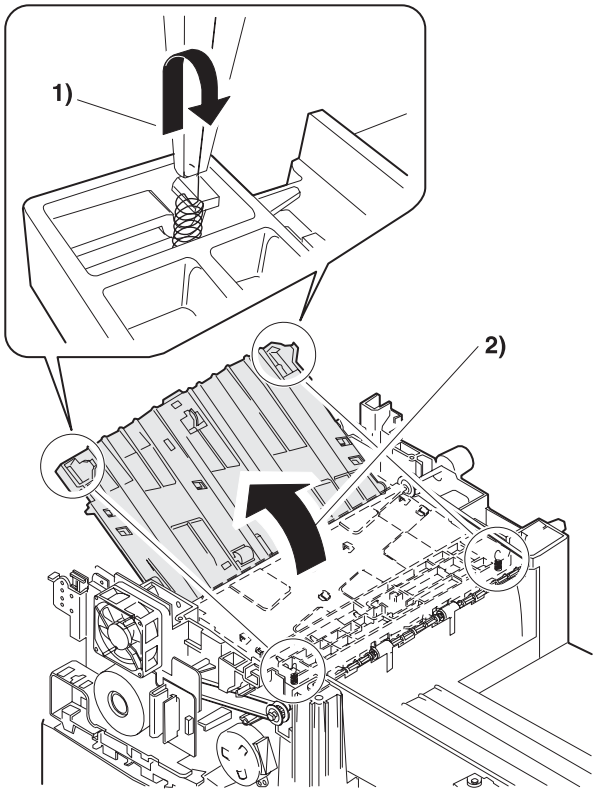
(2) Remove the PWB insulation mylar and remove the paper transport detection sensor (PPD2).



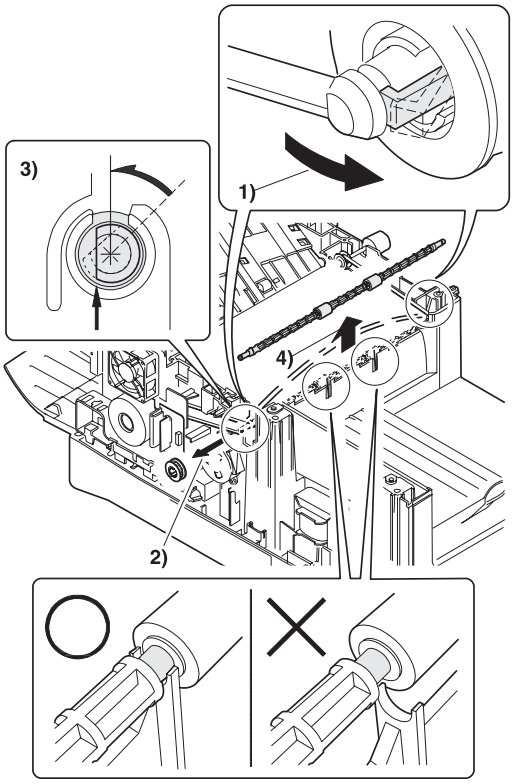
(3) Remove two screws and remove the toner motor.



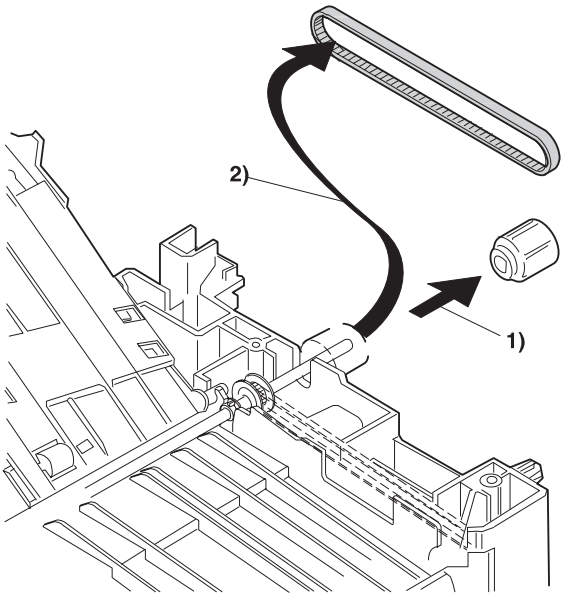
(4) Remove two springs and open the intermediate frame unit.



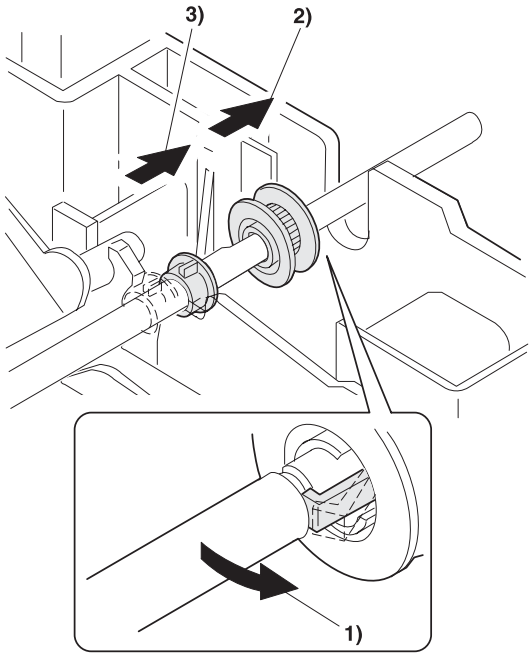
(5) Remove the pulleys on the both sides and remove the paper exit roller.



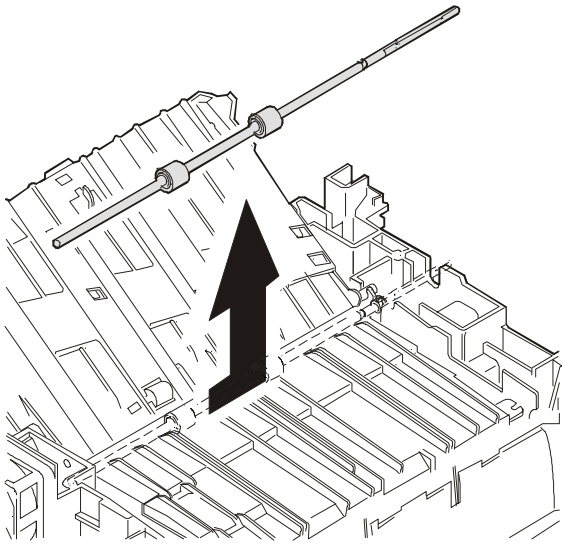
(6) Pull out the paper exit roller knob and remove the belt.



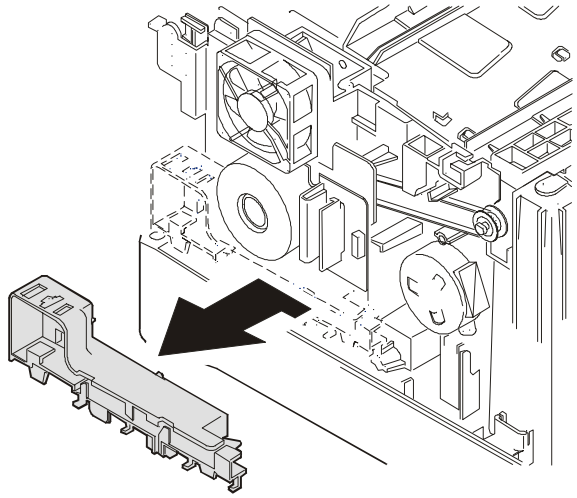
(7) Release the belt pulley lock and remove the belt pulley bearing.



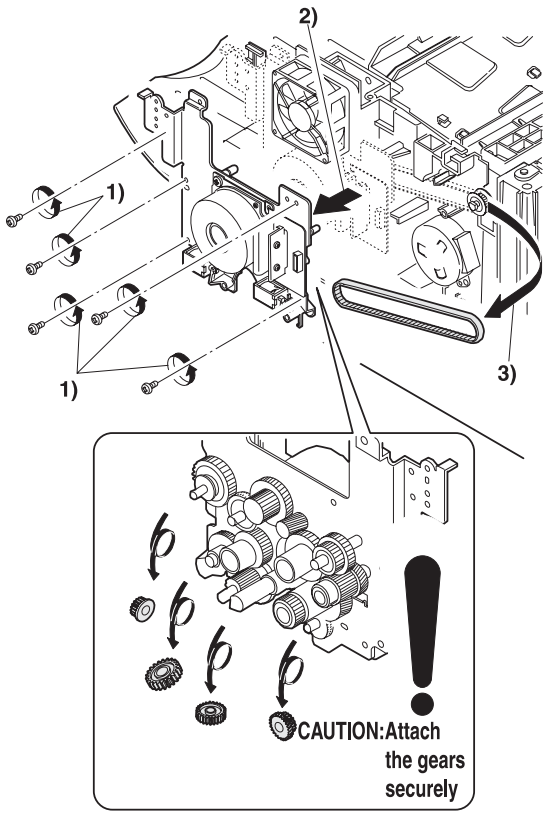
(8) Remove the paper exit roller.



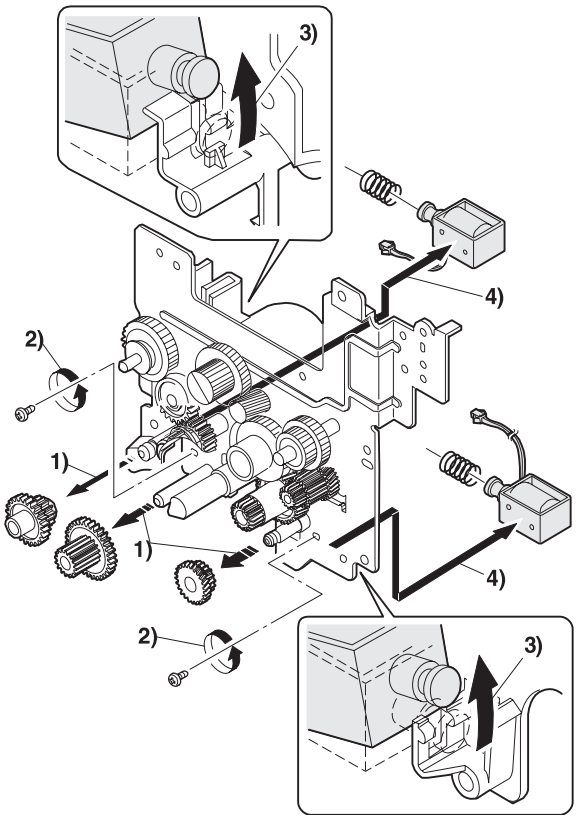
(9) Remove the harness guide.



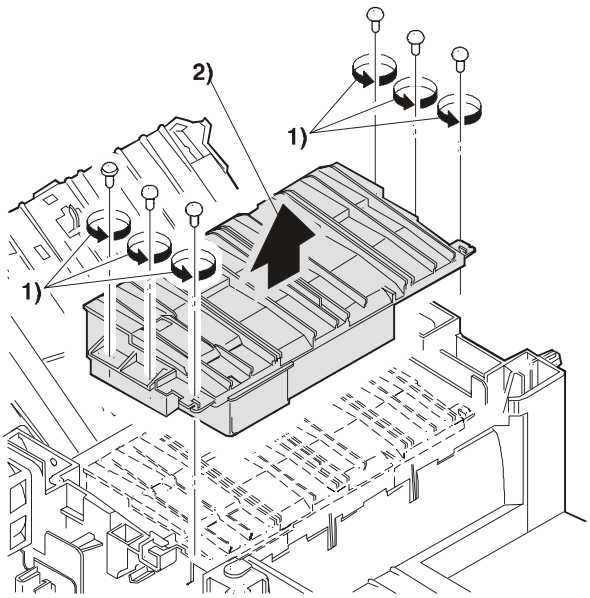
(10) Remove five screws and remove the main drive plate and the belt.



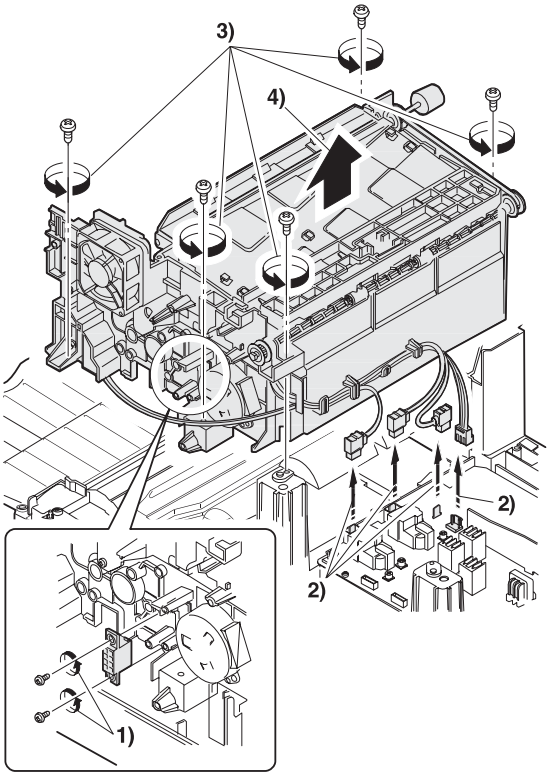
(11) Remove the parts as shown below, and remove the pressure release solenoid and the paper feed solenoid.



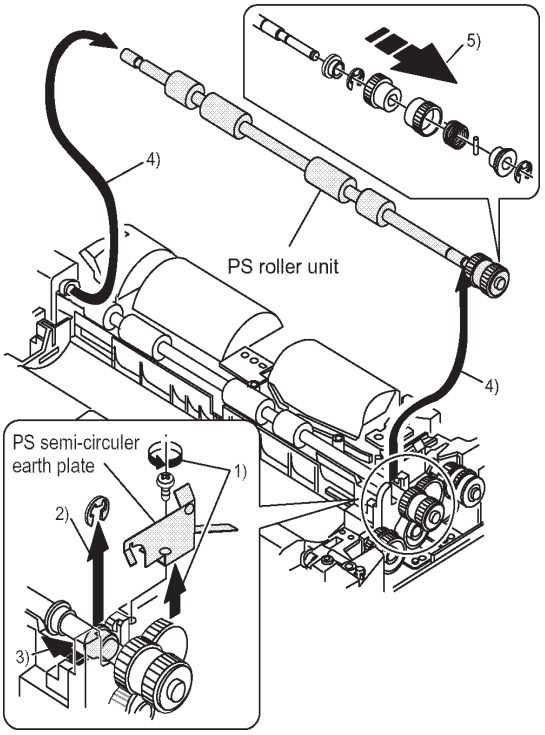
(12) Remove six screws and remove the LSU unit.



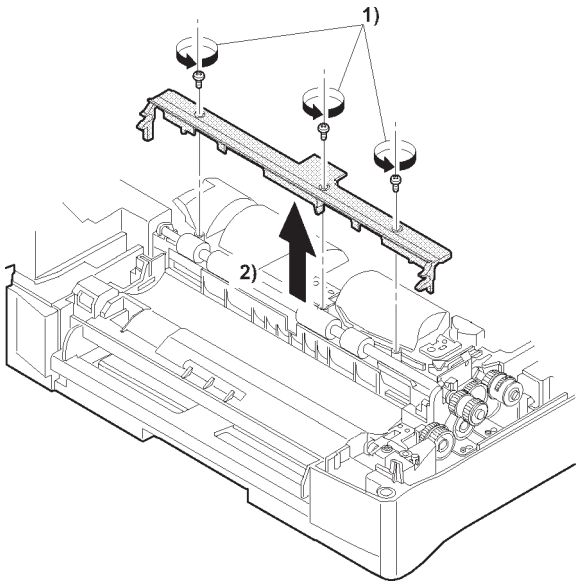
(13) Remove two screws and remove the fusing connector.
(14) Remove five screws and the connector, and lift the intermediate frame unit to remove.



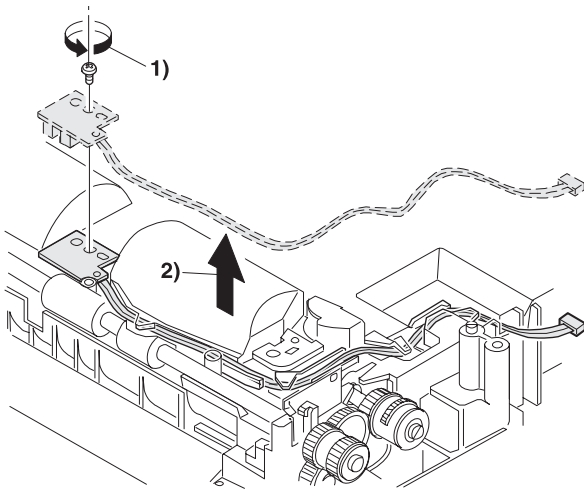
(15) Remove the screw and the E-ring, and remove the PS semi-circular earth plate and the PS roller unit.
(16) Remove the E-ring and remove the spring clutch from the PS roller unit.



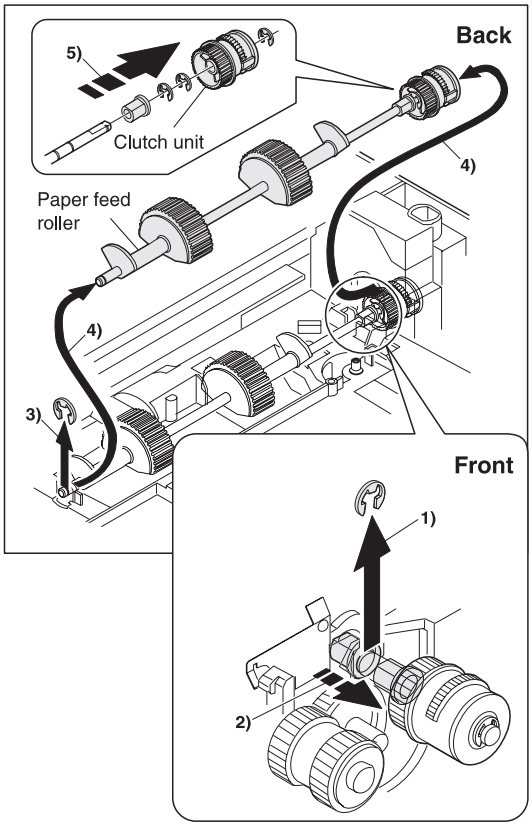
(17) Remove three screws and remove the TC front paper guide.



(18) Remove the screw and the connector, and remove the PPD1 sensor PWB.



(19) Remove two E-rings and remove the paper feed roller.
(20) Remove three E-rings and remove the clutch unit.



4.5.3 Assembly procedure

For assembly, reverse the disassembly procedure.

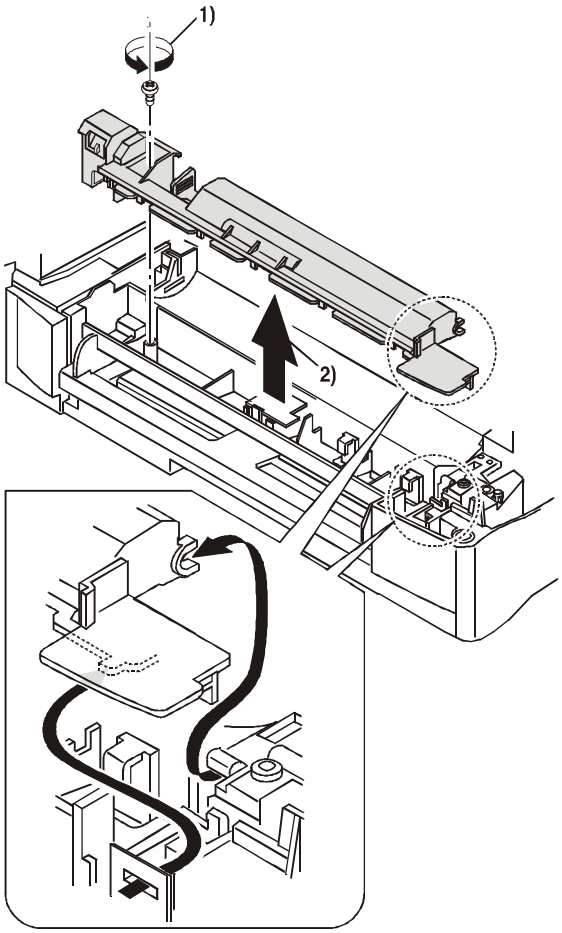
4.6 Manual paper feed section

4.6.1 List of parts

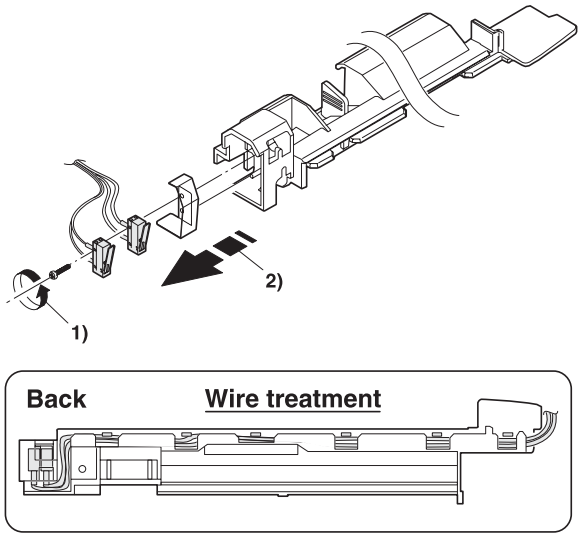
No.	Part name Ref.
1	Manual transport roller
2	Cassette detection switch
3	PPD1 sensor PWB
4	Side door detection unit

4.6.2 Disassembly procedure

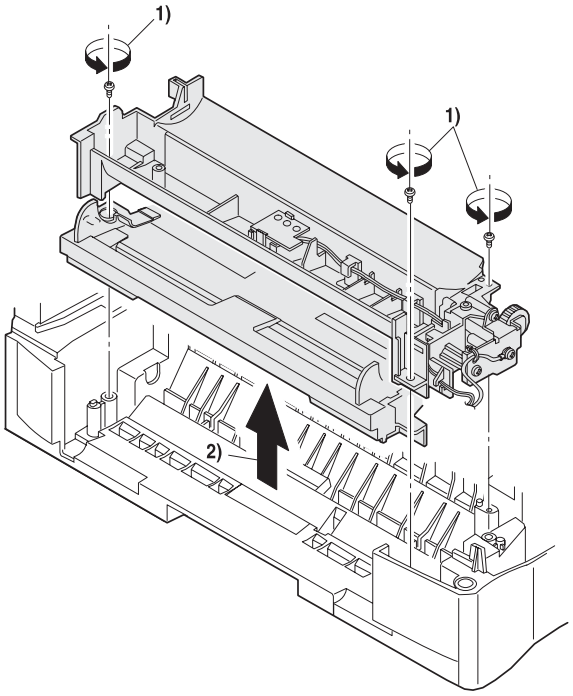
(1) Remove the screw and remove the single upper cover.



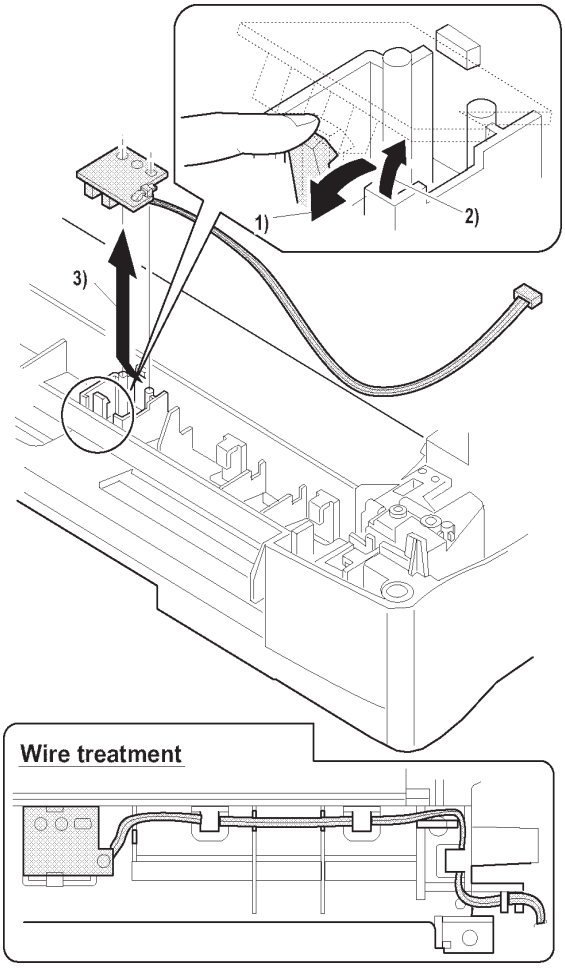
(2) Remove the screw and remove the side door detection unit.



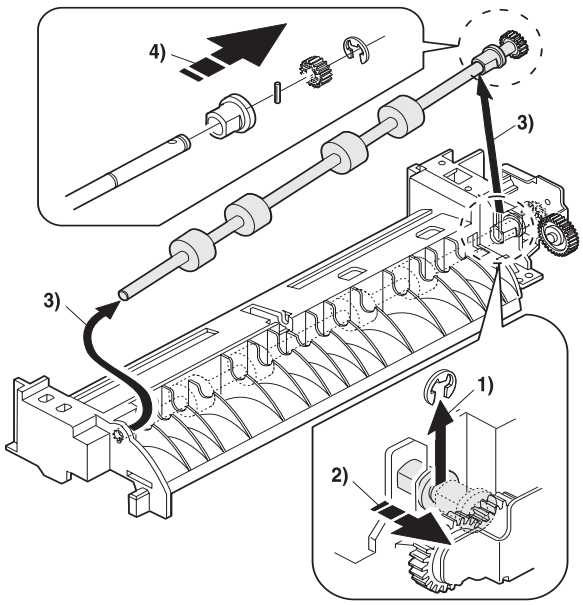
(3) Remove three screws and remove the single manual feed upper frame.



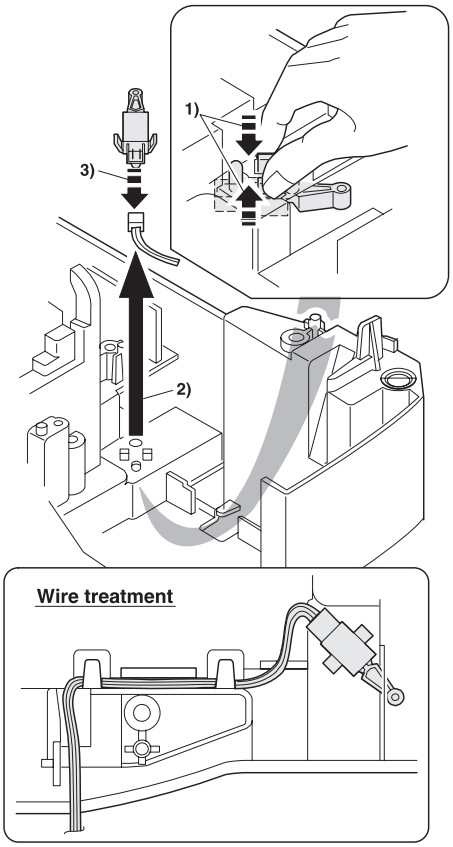
(4) Remove the PPD1 sensor PWB.



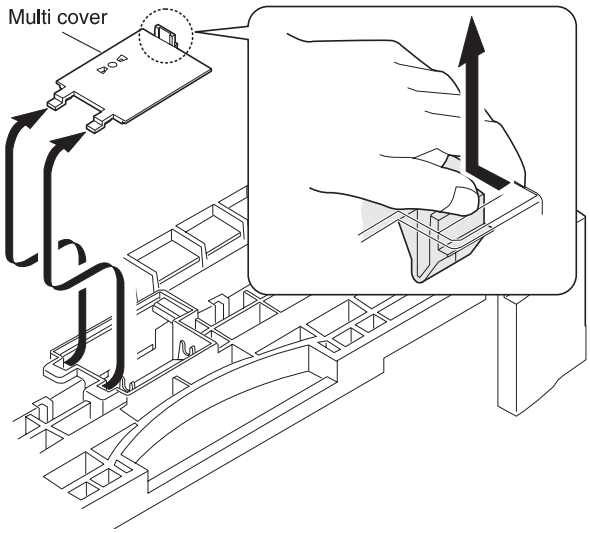
(5) Remove the E-ring and remove the manual paper feed transport roller.



(6) Remove the cassette detection switch.



(7) Remove the multi cover.



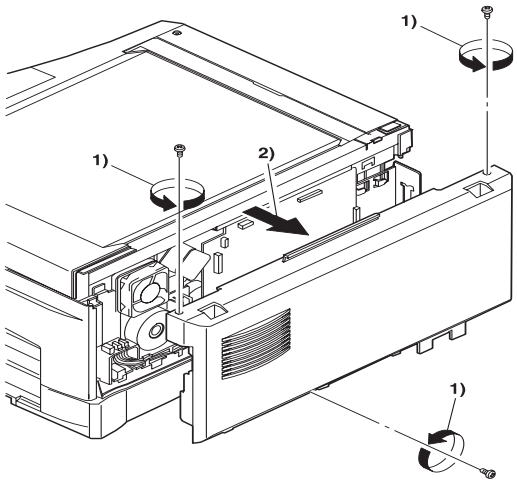
4.7 Rear frame section

4.7.1 List of parts

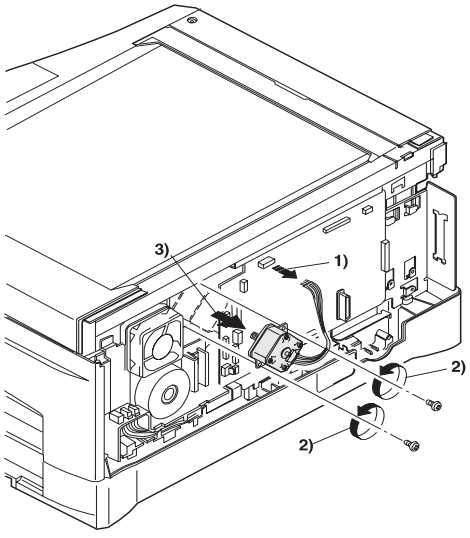
No.	Part name Ref.
1	Mirror motor
2	Main motor
3	Exhaust fan motor

4.7.2 Disassembly procedure

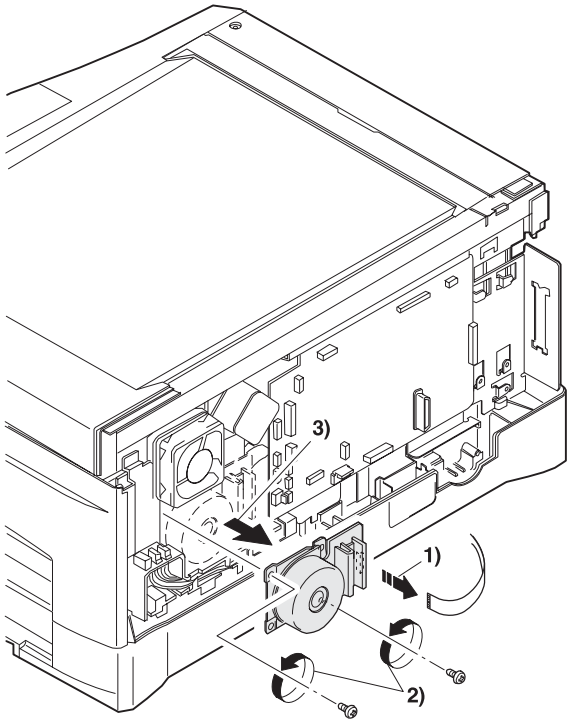
(1) Remove three screws and remove the rear cabinet.



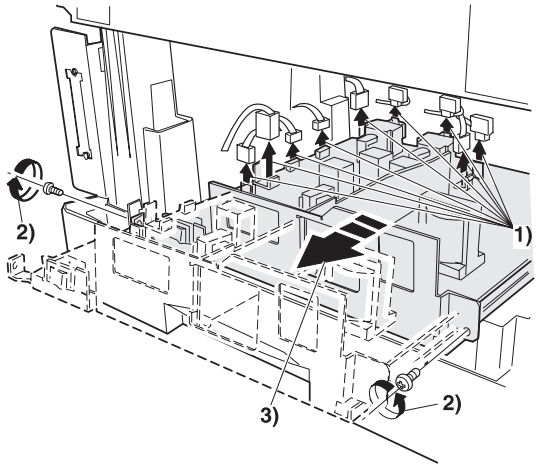
(2) Remove two screws, the harness, and the mirror motor.



(3) Remove two screws and one harness, and remove the main motor.



(4) Remove two screws and one connector, and remove the exhaust fan motor.



4.7.3 Assembly procedure

For assembly, reverse the disassembly procedure.

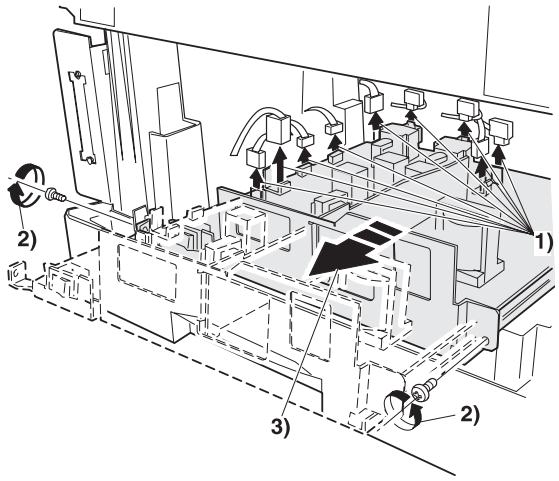
4.8 Power section

4.8.1 List of parts

No.	Part name Ref.
1	Power PWB

4.8.2 Disassembly procedure

(1) Remove two screws and one connector, and remove the power PWB.



4.8.3 Assembly procedure

For assembly, reverse the disassembly procedure.

■

5. ADJUSTMENTS

5.1 Image distortion adjustment

There are following two types of image distortion.

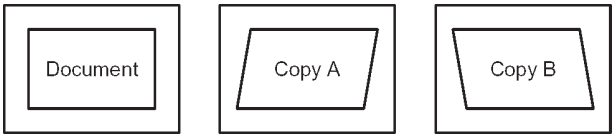
- Horizontal image distortion
- Vertical image distortion
  In this machine, the image distortion is adjusted by changing the parallelism of mirrors (copy lamp unit, No. 2/3 mirror unit).

5.1.1 Horizontal image distortion adjustment

Parallelism of mirrors can be made by installing the copy lamp unit and No. 2/3 mirror unit to the reference position. However, it must be checked by making a copy, and must be adjusted if necessary.

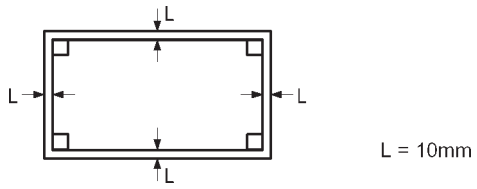
5.1.1.1 Cases when the adjustment is required

1) When the copy lamp unit and No.2/3 mirror unit are disassembled or their part is replaced.
2) When the copy lamp unit and No.2/3 mirror unit drive section is disassembled or its part is replaced.
3) When the copy image is distorted as shown below:



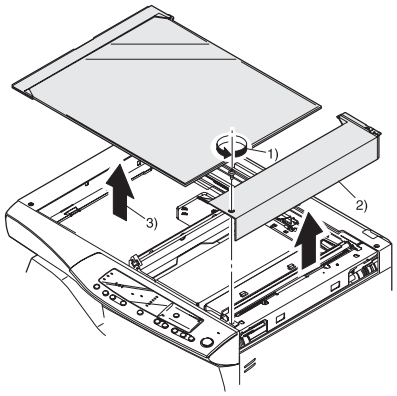
5.1.1.2 Necessary tools

- Screwdriver (+)
- Hex wrench
- Scale
- Test chart for distortion adjustment (Make a chart shown below by yourself.)
  Draw a rectangle on a paper (B4 or 8 1/2" x 14") as shown below.
  Be sure to make four right angles.

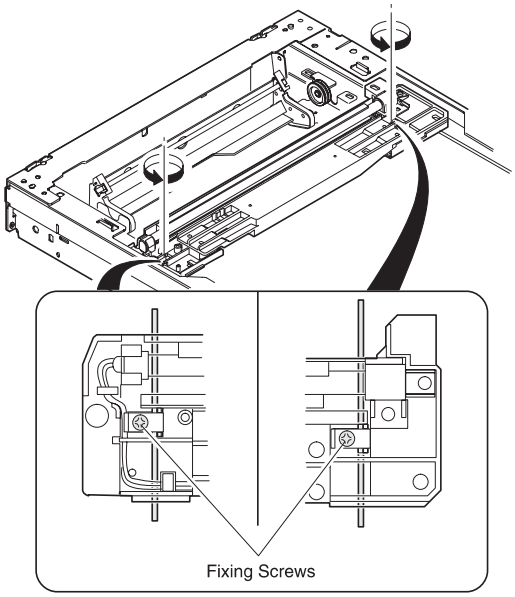


5.1.1.3 Adjustment procedure

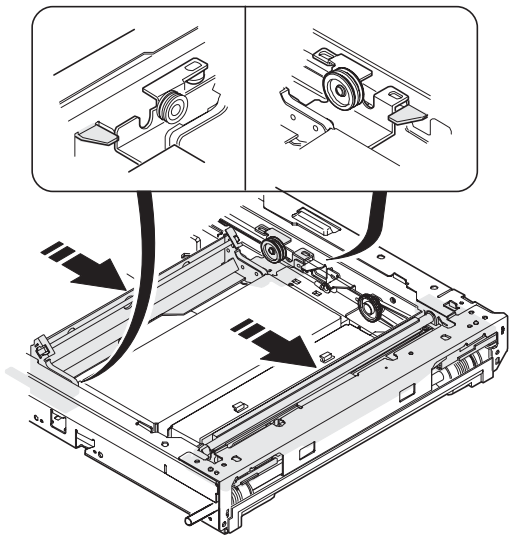
1) Remove the right cabinet (manual paper feed unit), the document reference plate.
2) Remove the document glass.



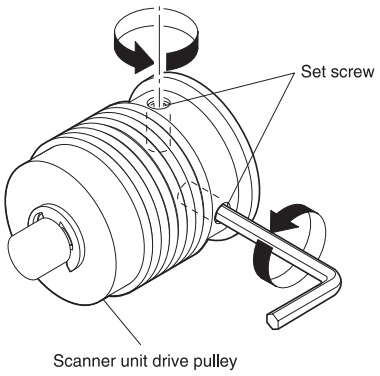
3) Loosen the fixing screw of the copy lamp unit wire.



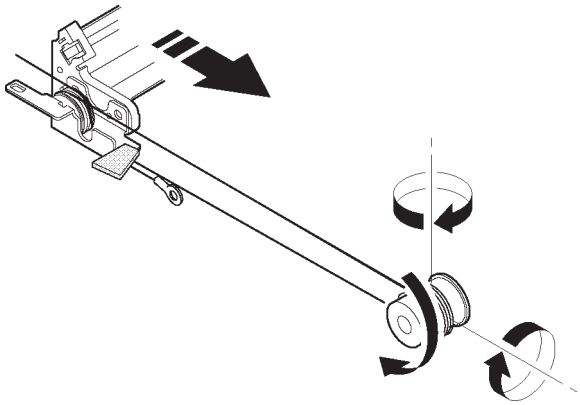
4) Manually turn the copy lamp unit/No.2/3 mirror unit drive gear to bring No.2/3 mirror unit into contact with No.2/3 mirror unit positioning plate. When No.2/3 mirror unit makes contact with No.2/3 mirror unit positioning plate in the Freat and rear frameside simultaneously, the mechanical parallelism of No.2/3 mirror unit is proper.
   If one side of No.2/3 mirror unit makes contact with No. 2/3 mirror unit positioning plate and the other side does not, the parallelism is improper.
   If the parallelism is improper, perform the procedure of step 5.



5) Loosen the copy lamp unit/No.2/3 mirror unit drive pulley setscrew in the side where No.2/3 mirror unit does not make contact with No.2/3 mirror unit positioning plate.

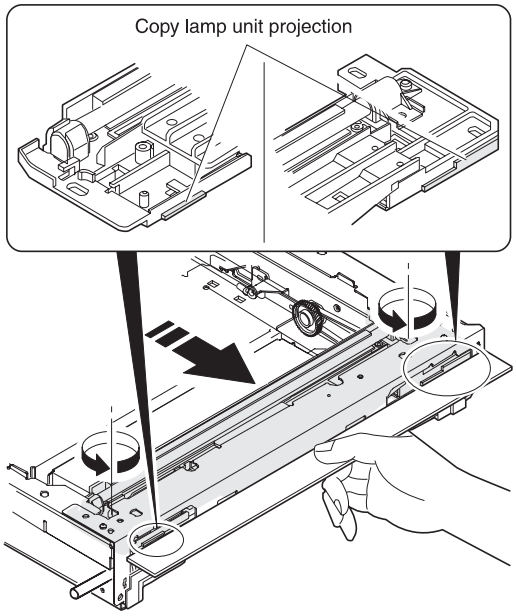


6) Without moving the copy lamp unit/No.2/3 mirror unit drive pulley shaft, manually turn the copy lamp unit/ No.2/3 mirror unit drive pulley in the same direction of the loosened setscrew. When it makes contact with No.2/3 mirror unit positioning plate, tighten and fix the setscrew.

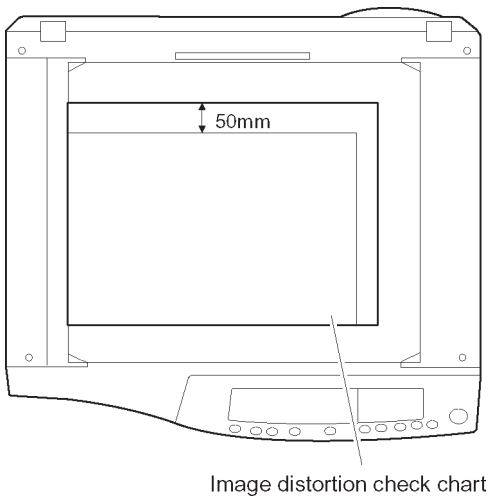


7) Manually turn the copy lamp unit/No.2/3 mirror unit drive gear to bring No.2/3 mirror unit into contact with the positioning plate, and perform the procedure of step 4. Repeat procedures of steps 4 to 7 until the parallelism of No.2/3 mirror unit is properly set.

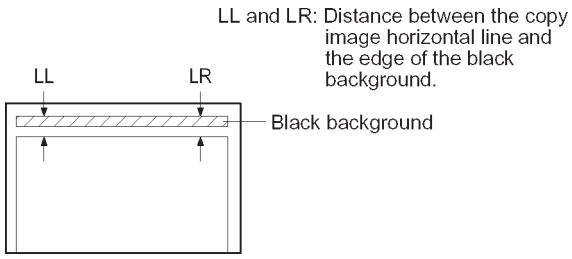
8) With No.2/3 mirror unit positioning plate in contact with No.2/3 mirror unit, bring the copy lamp unit into contact with the right frame and fix the copy lamp unit to the drive wire. Procedures 1 to 8 are for adjustment of mechanical horizontal parallelism. The copy lamp unit and No.2/3 mirror are fixed to the specified positions and the mechanical horizontal parallelism of No.2/3 mirror is adjusted. Then the optical horizontal parallelism must be adjusted in the following procedures.



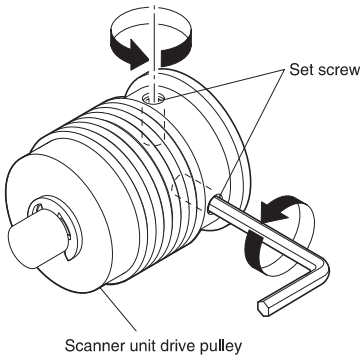
9) Set the image distortion check chart on the document table, and make a reduction copy (75%) on an A4 or 11" x 8 1/2" paper with the document cover open.



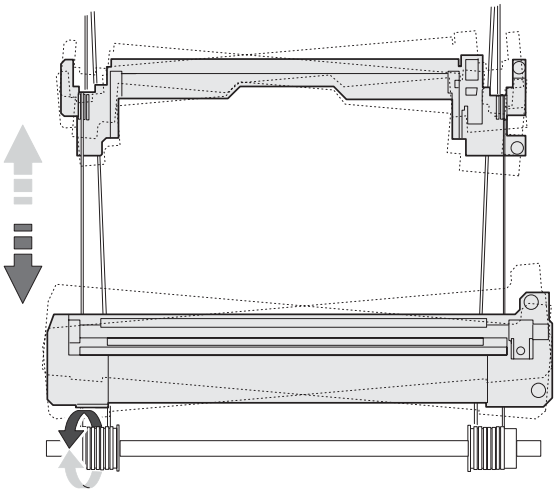
10) Check the horizontal image distortion.
If LL = LR, there is no horizontal distortion



11) If LL is not equal to LR, perform the following procedure.
Loosen the setscrew of the copy lamp unit/No.2/3 mirror unit drive pulley in the front or the rear frame.



12) Without moving the copy lamp unit/No.2/3 mirror unit drive pulley shaft, manually turn the copy lamp unit/ No.2/3 mirror unit drive pulley whose setscrew was loosened, and adjust the parallelism of copy lamp unit/ No.2/3 mirror unit.



13) Tighten the set screw of the copy lamp unit/No.2/3 mirror unit drive pulley.
14) Check the image distortion in the same manner as step 10. Repeat procedures 11 to 14 until horizontal image distortion is eliminated.

5.1.2 Vertical image distortion adjustment

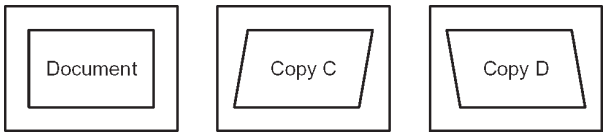
In this adjustment, the left and right balance is adjusted by changing the left and right balance of the No. 2 scanner unit frame on the front frame side.

5.1.2.1 Note

• Horizontal image distortion adjustment

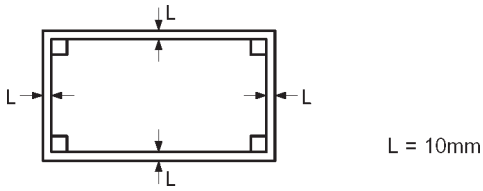
5.1.2.2 Cases when the adjustment is required

1) When the copy lamp unit/No.2/3 mirror unit drive section is disassembled or its part is replaced.
2) When the copy image is distorted as follows:



5.1.2.3 Necessary tools

- Screwdriver (+)
- Screwdriver (–)
- Scale
- Test chart for distortion adjustment (Make yourself). Draw a rectangle on A4 or 8 1/2" x 11" paper as shown below:
  Be sure to make four right angles.

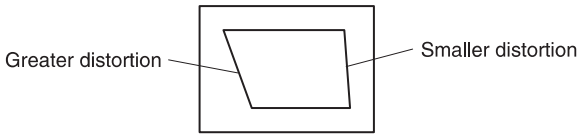


5.1.2.4 Adjustment procedure

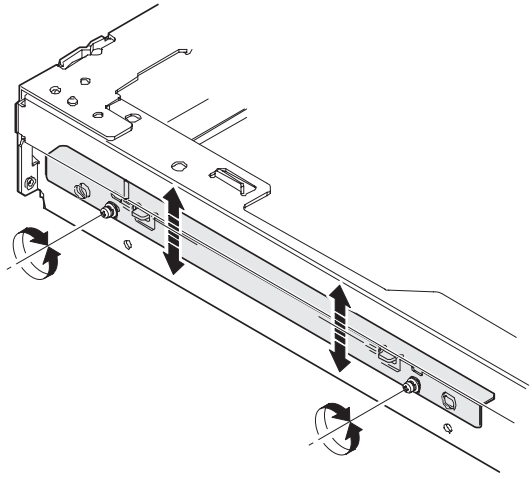
1) Set the test chart for image distortion adjustment on the document glass, and make a normal copy on a paper of A4 or 8 1/2" x 11".

2) Check image distortion in the right and the left sides.If the both vertical lines are in parallel with each other, the rightleft distortion balance is proper. (However, there may be some distortion).

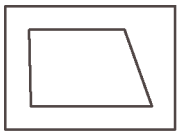
   If all the four angles are right angles, there in no distortion and the following procedures are not required.



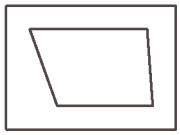
3) If the right-left distortion balance is improper, loosen the fixing screw of No.2/3 mirror unit rail to change and adjust the right-left balance of No.2/3 mirror unit rail.



Note:
If the distortion in the lead edge side (when viewed in the paper transport direction) is greater, change the height of the left rail of No.2/3 mirror unit.
If the distortion in the rear edge side (when viewed in the paper transport direction) is greater, change the height of the right rail of No.2/3 mirror unit.

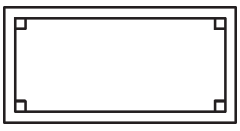


Change the height of the right side of the rail.



Change the height of the left side of the rail.

4) Make a copy to check the vertical image distortion.
If the four angles are right angles, the adjustment is completed.



5.2 Copy magnification ratio adjustment

The copy magnification ratio must be adjusted in the main scanning direction and in the sub scanning direction. To adjust, use SIM 48-1.

The main scanning (front/rear) direction magnification ratio adjustment is made automatically or manually.

Automatic adjustment: The width of the reference line marked on the shading correction plate is scanned to perform the main scanning (front/rear) direction magnification ratio adjustment automatically.

Manual adjustment: The adjustment is made by manual key operations. (In either of the automatic and manual adjustments, the zoom data register set value is changed for adjustment). The magnification ratio in the sub scanning direction is adjusted by changing the mirror base (scanner) scanning speed.

5.2.1 Main scanning direction magnification ratio adjustment

Before performing this adjustment, the following adjustments must have been completed. If not, this adjustment cannot be performed properly.
- Image distortion adjustment
- The lens unit must be installed in the reference position.

5.2.1.1 Cases when the adjustment is required

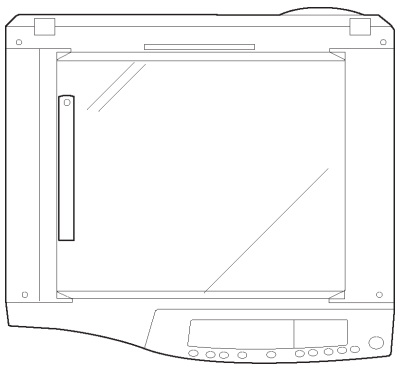
1) When the lens and the mirror unit are disassembled or the part is replaced.
2) When the copy lamp unit/No.2/3 mirror unit drive section is disassembled
or the part is replaced.
3) When the main PWB is replaced.
4) When the EEPROM in the main PWB is replaced.
5) When “U2” trouble occurs.
6) When the copy image distortion adjustment is performed.

5.2.1.2 Necessary tools

- Screwdriver (+)
- Scale

5.2.1.3 Adjustment procedure

1) Set the scale vertically on the document table. (Use a long scale for precise adjustment.)

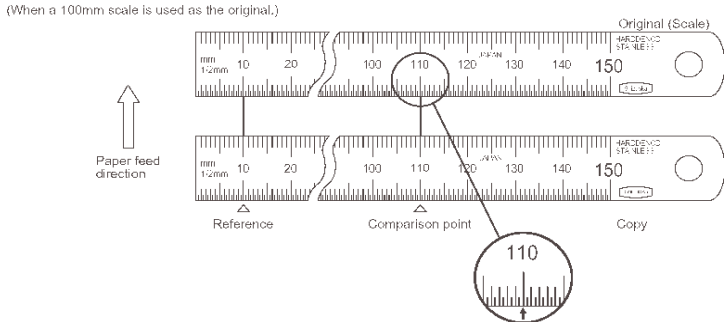


2) Set the copy magnification ratio to 100%.
3) Make a copy on A4 or 81/2” x 11” paper.

4) Measure the length of the copied scale image.

5) Calculate the main scanning direction magnification ratio.
Main scanning direction magnification ratio

$$= \frac{\text{Copy image dimensions}}{\text{Original dimension}} \times 100\,(\%)$$



6) Check that the copy magnification ratio is within the specified range. If it is not within the specified range, perform the following procedures.

7) Execute SIM 48-1 to select the main scanning direction copy magnification ratio adjustment mode. To select the adjustment mode, use the copy mode select key.

In the case of the automatic adjustment, when the PRINT switch is pressed, the mirror base unit moves to the white plate for shading to scan the width of the reference line, calculating the correction value and displaying and storing this value.
After execution of the automatic adjustment, go out from the simulation mode and make a copy to check the magnification ratio. If the magnification ratio is not in the specified range (100 ±1.0%), manually adjust as follows.

Adjustment mode	Lighting lamp
Main scanning direction auto copy magnification ratio adjustment	Auto exposure lamp ON
Main scanning direction manual copy magnification ratio adjustment	Manual exposure lamp ON
Sub scanning direction copy magnification ratio adjustment	Photo exposure lamp ON

8) Set the adjustment mode to Manual with the copy mode select key.
9) Enter the new set value of main scanning direction copy magnification ratio with the copy quantity set key, and press the COPY button.
10) Change the set value and repeat the adjustment until the ratio is within the speoified range.
When the set value is changed by 1, the magnification ratio is changed by 0.1%.

5.2.2 Sub scanning direction copy magnification ratio

Before performing this adjustment, the following adjustments must have been completed. If not, this adjustment cannot be performed properly.
- Image distortion adjustment
- Must be installed to the lens unit reference position.

5.2.2.1 Cases when the adjustment is required

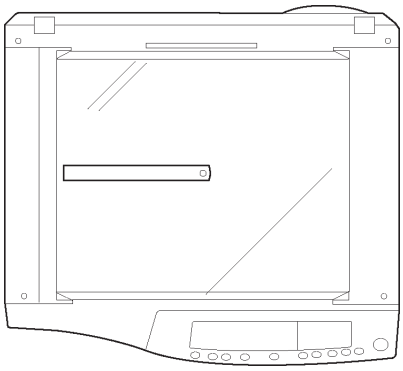
1) When the lens and the mirror unit are disassembled or the part is replaced.
2) When the scanner unit drive section is disassembled or the part is replaced.
3) When the main PWB is replaced.
4) When the EEPROM in the main PWB is replaced.
5) When “U2” trouble occurs.
6) When the copy image distortion adjustment is performed.

5.2.2.2 Necessary tools

- Screwdriver (+)
- Scale

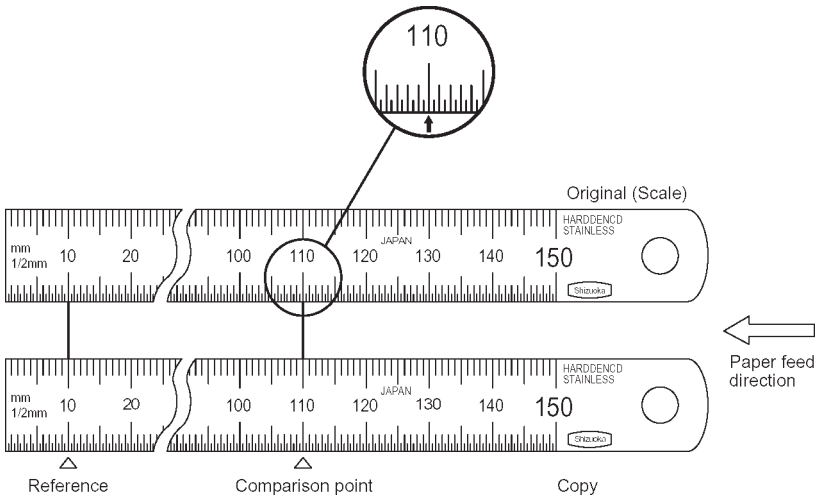
5.2.2.3 Adjustment procedure

1) Set the scale on the document table as shown below. (Use a long scale for precise adjustment.)



2) Set the copy magnification ratio to 100%.
3) Make a copy on A4 or 81/2” x 11” paper.
4) Measure the length of the copied scale image.
5) Calculate the sub scanning direction copy magnification ratio.

$$= \frac{\text{Copy image dimensions}}{\text{Original dimension}} \times 100\,(\%)$$



6) Check that the actual copy magnification ratio is within the specified range. (100 ± 1.0%).
If it is not within the specified range, perform the following procedures.

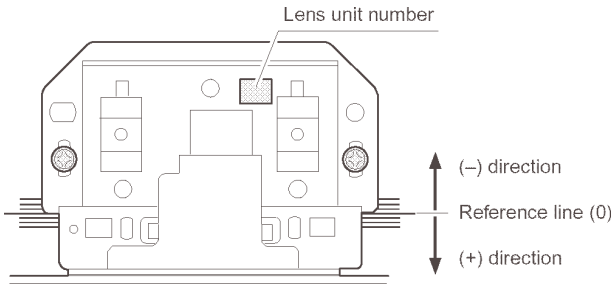
7) Execute SIM 48-1 to select the sub scanning direction copy magnification ratio adjustment mode. To select the adjustment mode, use the copy mode select key.
(Photo exposure lamp ON)

8) Enter the new set value of sub scanning direction copy magnification ratio with the copy quantity set key, and press the COPY button.

Repeat procedures 1-8 until the sub scanning direction actual copy magnification ratio in 100% copying is within the specified range.
When the set value is changed by 1, the magnification ratio is changed by 0.1%.

5.2.3 Lens unit attachment reference

Attach the lens unit so that the lens unit number on the lens adjustment plate is aligned with the scribe line on the base plate.



Example: Lens unit number –2.8
Attach the lens unit at 2 scales in the paper exit direction from the reference line.

Note: Never touch the other screws than the unit attachment screw. The lens unit is supplied only in a whole unit.

5.2.4 Image position adjustment

There are following five kinds of image position adjustments, which are made by laser control except for the image scan start position adjustment. For the adjustments, SIM 50 – 01 and SIM 50 – 10 are used.

No.	Adjustment item	Simulation
1	Print start position	50 – 01
2	Image lead edge void amount	50 – 01
3	Image scan start position	50 – 01
4	Image rear edge void amount	50 – 01
5	Center offset	50 – 10

To select the adjustment mode with SIM 50 – 01, use the copy density select key.
The relationship between the adjustment modes and the lighting lamps are as shown in the table below.

Adjustment mode	Lighting lamp
Print start position	Auto (AE) lamp
Image lead edge void amount	Manual (TEXT) lamp
Image scan start position	Photo lamp
Image rear edge void amount	Auto, Manual, Photo lamps

To select the adjustment mode with SIM 50 – 10, use the copy mode select key.

The relationship between the adjustment modes and the lighting lamps are as shown in the table below

Machine with the multi manual paper feed unit.

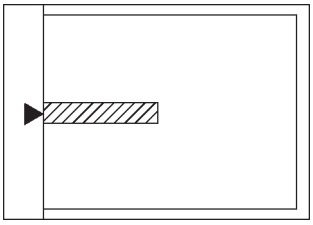
Adjustment mode	Lighting lamp
Print center offset (cassette)	Auto, Cassette
Print center offset (manual feed)	Auto, Manual
Document center offset	Auto, Manual

Machine with the single manual paper feed unit

Print center offset (cassette)	Auto, Cassette
Print center offset (manual feed)	Auto
Document center offset	Auto, Manual

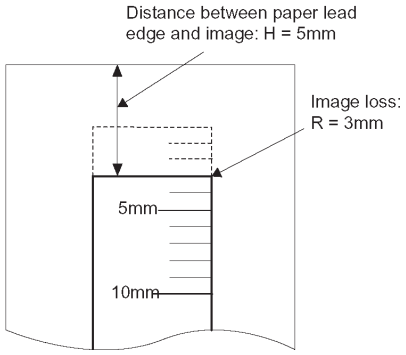
5.2.4.1 Lead edge adjustment

1) Set a scale to the center of the paper lead edge guide as shown below, and cover it with B4 or 8 1/2" x 14" paper.



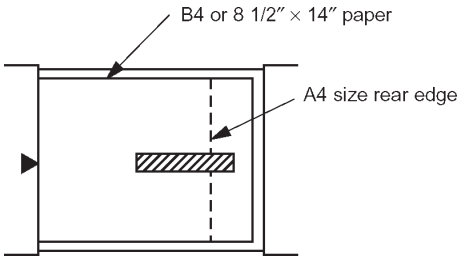
2) Execute SIM 50 – 01
3) Set the print start position (AE lamp ON) (A), the lead edge void amount (TEXT lamp ON) (B), and the scan start position (PHOTO lamp ON) (C) to 0, and make a copy of a scale at 100%.
4) Measure the image loss amount (R mm) of the scale image. Set C = 10 x R (mm). (Example: Set the value of C to 30.) When the value of C is increased by 10, the image loss is decreased by 1mm. (Default: 50)
5) Measure the distance (H mm) between the paper lead edge and the image print start position. Set A = 10 x H (mm). (Example: Set the value of A to 50.)
   When the value of A is increased by 10, the image lead edge is shifted to the paper lead edge by 1mm. (Default: 50)
6) Set the lead edge void amount to B = 50 (2.5mm).
   When the value of B is increased by 10, the void amount is increased by about 1mm. For 25 or less, however, the void amount becomes zero. (Default: 50)

(Example)

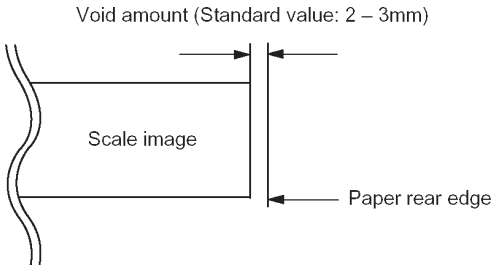


5.2.4.2 Image rear edge void amount adjustment

1) Set a scale to the rear edge section of A4 or 11" x 8 1/2" paper size as shown in the figure below, and cover it with B4 or 8 1/2" x 14" paper.



2) Execute SIM 50 – 01 to select the image rear edge void amount adjustment mode.
   The set adjustment value is displayed on the copy quantity display.
3) Make a copy and measure the void amount of image rear edge.

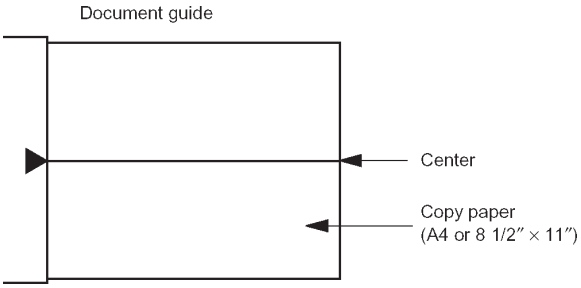


4) If the measurement value is out of the specified range, change the set value and repeat the adjustment procedure. The default value is 50.

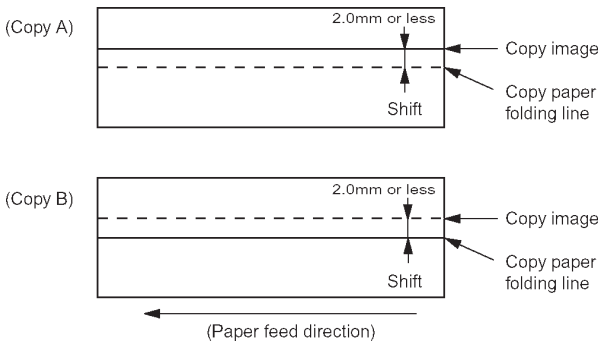
   Note: The rear edge void cannot be checked with the first sheet after entering the simulation mode, the first sheet after turning off/on the power, or the first sheet after inserting the cassette. Use the second or later sheet to check the rear edge void.

5.2.4.3 Center offset adjustment

1) Set the self-made test chart for the center position adjustment so that its center line is aligned with the center mark of the document guide.
   - Test chart for the center position adjustment
     Draw a line at the center of A4 or 8 1/2" x 11" paper in the paper transport direction.



2) Execute SIM 50 – 10 to select the print center offset (cassette paper feed) adjustment mode. The set adjustment value is displayed on the copy quantity display.
3) Make a copy and check that the copied center line is properly positioned.
   The standard value is 0 ± 2mm from the paper center.



4) If the measured value is out of the specified range, change the set value and repeat the adjustment procedure. When the set value is increased by 1, the copy image is shifted by 0.1mm toward the rear frame.
   - For the manual paper feed, change the manual paper feed adjustment mode and perform the similar procedures.
   - Since the document center offset is automatically adjusted by the CCD which scan the reference lines (F/R) on the back of document guide, there is no need to adjust manually.

5.3 Copy density adjustment

5.3.1 Copy density adjustment timing

The copy density adjustment must be performed in the following cases:

- When maintenance is performed.
- When the developing bias/grid bias voltage is adjusted.
- When the optical section is cleaned.
- When a part in the optical section is replaced.
- When the optical section is disassembled.
- When the OPC drum is replaced.
- When the main control PWB is replaced.
- When the EEPROM on the main control PWB is replaced.
- When the memory trouble (U2) occurs.

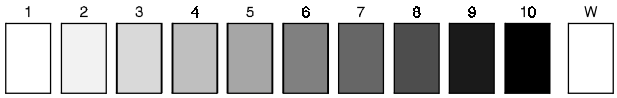
5.3.2 Note for copy density adjustment

5.3.2.1 Arrangement before execution of the copy density adjustment

- Clean the optical section.
- Clean or replace the charger wire.
- Check that the voltage at the high voltage section and the developing bias voltage are in the specified range.

5.3.3 Necessary tool for copy density adjustment

- One of the following test charts:
  UKOG-0162FCZZ, UKOG-0089CSZZ, KODAK GRAY SCALE
- B4 (14” x 8 1/2”) white paper
- The user program AE setting should be “3.”



Test chart comparison table

UKOG-0162FCZZ DENSITY No.	1	2	3	4	5	6	7	8	9	10	W
UKOG-0089CSZZ DENSITY No.	0.1		0.2		0.3				0.5	1.9	0
KODAK GRAY SCALE		1		2		3		4		19	A

5.3.4 Features of copy density adjustment

For the copy density adjustment, the image data shift function provided in the image process LSI is used.

List of the adjustment modes.

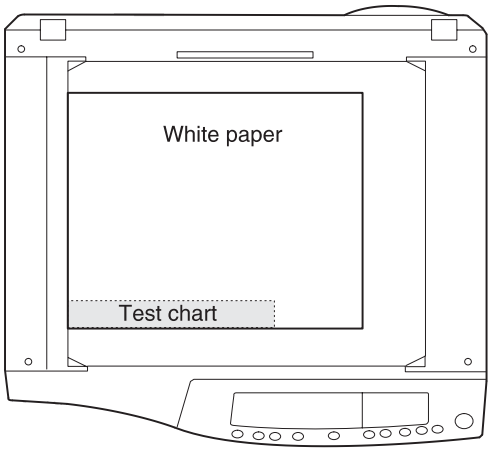
Auto Mode	Brightness 1 step only
Manual Mode	Brightness 5 steps. Adjustment of only the center brightness is made.
Photo Mode	Brightness 5 steps. Adjustment of only the center brightness is made.
Manual T/S	Brightness 5 steps. Adjustment of only the mode center brightness is made.
T/S Auto mode	Brightness 1 step only

5.3.5 Copy density adjustment procedure

Use SIM 46-01 to set the copy density for each copy mode. For selection of modes, use the copy mode select key.

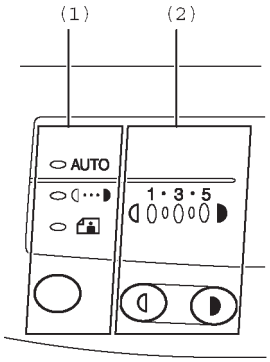
5.3.5.1 Test chart (UKOG-0162FCZZ) setting

1) Place the test chart so that its edge is aligned with the A4 (Letter) reference line on the document table. Then place a B4 (14" x 8 1/2") white paper on the test chart and close the document cover.



5.3.5.2 Perform the adjustment in each mode.

1) Execute SIM 46-1.
2) Select the mode to be adjusted with the exposure mode select key. Set the exposure level to 3 for all adjustment. (Except for the auto mode.)

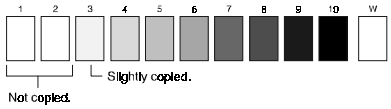
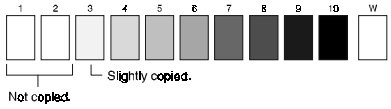


(1) Mode select key/display lamp

(2) Exposure level select key/display lamp

Adjustment mode	Exposure mode display lamp	Exposure level	Sharp gray chart adjustment level
Auto mode	Auto lamp ON	—	"3" is slightly copied.
Manual mode	Manual lamp ON	3	"3" is slightly copied.
Photo mode	Photo lamp ON	3	"3" Is slightly copied.
Manual T/S mode	Manual lamp/Photo lamp ON	3	"4" is slightly copied.
Auto T/S mode	Auto lamp/Photo lamp ON	3	"4" is slightly copied.

3) Make a copy.
Check the adjustment level (shown in the above table) of the exposure test chart (Gray Scale).

	Sharp Gray Scale adjustment level
Non toner save mode	
Toner save mode	

(When too bright): Decrease the value displayed on the copy quantity display.
(When too dark): Increase the value displayed on the copy quantity display.

* The value can be set in the range of 1 - 99.

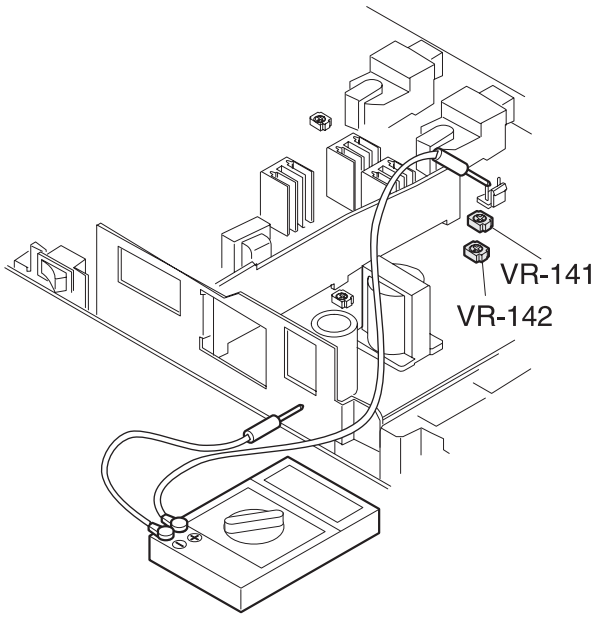
5.4 High voltage adjustment

5.4.1 Main charger (Grid bias)

- Use a digital multi meter with internal resistance of 10MW or more measurement.
- After adjusting the grid LOW output, adjust the HIGH output.
  Do not reverse the sequence.

5.4.1.1 Procedures

1. Set the digital multi meter range to DC700V.
2. Set the positive side of the test rod to the connector CN11-3 (GRID) of high voltage section of the power PWB and set the negative side to the frame ground (radiating plate).
3. Execute SIM 8-3. (The main charger output is supplied for 30 sec in the grid voltage LOW output mode.)
4. Adjust the control volume (VR-141) so that the output voltage is – 400 ±20V.
5. Execute SIM 8-2. (The main charger output is supplied for 30 sec in the grid voltage HIGH output mode.)
6. Adjust the control volume (VR-142) so that the output voltage is 580 ±10V.

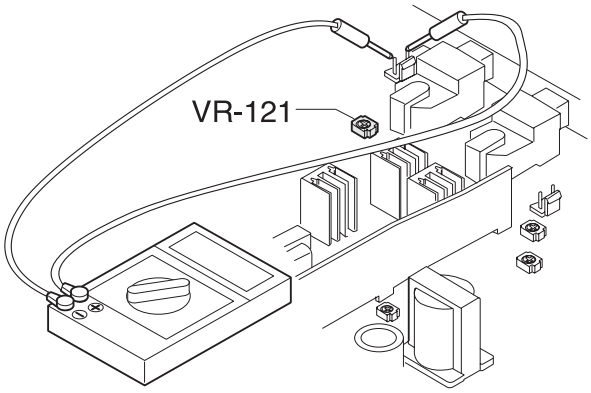


5.4.2 DV bias adjustment

- A digital multi meter with internal resistance of 1GW must be used for correct adjustment.

5.4.2.1 Procedures

1. Set the digital multi meter range to DC500V.
2. Set the positive side of the test rod to the connector CN-10-1 (DV BIAS) and set the negative side to the connector CN10-2 (FG).
3. Execute SIM 8-1. (The developing bias is outputted for 30 sec.)
4. Adjust the control volume (VR-121) so that the output voltage is – 400 ±5V.



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6. SIMULATIONS AND TROUBLE CODES

6.1 Simulations

6.1.1 List of simulations

Sim No.	Kind of main code	Sub code	Operation
01	Optical system	01	Mirror scan operation
05	Lamp ON check	01 02 03	Operation panel display check Fusing lamp ON + Cooling fan HIGH/LOW speed Copy lamp ON
06	Machine individual load operation	01 02	Paper feed solenoid ON Resist solenoid ON
07	Aging	01 06	Warm up display and aging with jam Intermittent aging
08	High voltage output check	01 02 03 06	Developing bias Main charger (Grid high) Grid Voltage (Low) Transfer charger.
10	Other	None	Toner motor aging
14	Trouble reset	None	Cancel troubles other than U2
16	U2 Trouble reset	None	Cancel of U2 trouble
20	Manteinance counter clear	01	Manteinance/mini-manteinance counter clear
21	Counter setup (When manteinance)	01 02	Manteinance cycle setup Mini-manteinance cycle setup
22	Counter display	01 02 05 06 12 14	Maintenance/mini-maintenance counter display Maintenance/mini-maintenance preset display Total counter display Developer counter display Drum counter display P-ROM version display
24	Special counter clear	06 07	Developer counter clear Drum counter clear
25	Main motor ON	01 10	Main motor system ON + Cooling fan low speed Poligon motor ON

Sim No.	Kind of main code	Sub code	Operation
26	Various setup	01	Manual feed setup
		02	SPF setup
		03	Second cassette setup
		04	Machine duplex setup
		06	Destination setup
		07	Machine conditions check
		20	Rear edge void setup
		30	CE mark conformity control ON/OFF setup
		37	Cancel of stop at developer over
		39	Memory capacity setup
		40	Polygon motor OFF time setup
		42	Transfer ON timing control setup
		43	Side void setup
30	Sensor operation check (standard provision)	01	Paper sensor display status
43	Fusing temp. setup	01	Normal copy
		04	Fusing temperature setup 2
46	Exposure adjustment	01	Copy density adjustment
		19	Gamma table adjustment (Copy mode)
48	Magnification ratio correction	01	Front/rear scan ditrection
50	Lead edge adjustment	01	Lead edge image position adjustment Paper lead edge/rear edge void adjustment
		10	Paper center offset + OC/Document center offset
51	Timing adjustment	02	Resist quantity adjustment
61	Laser system operation	03	Pligon motor check (HSYNC output check)
63	Shading	01	Shading check
64	Self print	01	Self print only with the engine (1 by 2 mode)

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>01</td><td>01</td><td>Mirror scan operation
(Operation/Procedure)

1. When this simulation is executed, the mirror home position is detected.
<table><tr><td>Sensor name
Mirror home position sensor</td><td>Display lamp
OPC drum cartridge replacement lamp</td></tr></table>
2. When the _START key is pressed, scanning is executed at the speed corresponding to the currently set copy magnification ratio.
The copy magnification ratio can be arbitrarily set with the magnification ratio select key/zoom key.</td></tr>
<tr><td rowspan="3">05</td><td>01</td><td>Operation panel display check
When the PRINT switch is pressed, the LED on the operation panel is lighted for 5 sec.</td></tr>
<tr><td>02</td><td>Fusing lamp ON + cooling fan HIGH/LOW speed
(Operation/Procedure)
When the START key is pressed, the fusing lamp repeats ON (500ms) and OFF (500msec) 5 times.
During this period, the cooling fan rotates in the high speed mode. After completion of the operation, the cooling fan rotates in the low speed mode.</td></tr>
<tr><td>03</td><td>Copy lamp ON
(Operation/Procedure)
When the START key is pressed, the copy lamp is lighted for 5 sec.</td></tr>
<tr><td rowspan="2">06</td><td>01</td><td>Paper feed solenoid ON
(Operation/Procedure)
When the START key is pressed, the paper feed solenoid selected by the tray select key repeats ON (500ms) and OFF (500ms) 20 times.</td></tr>
<tr><td>02</td><td>Resist solenoid ON
(Operation/Procedure)
When the START key is pressed, the resist solenoid (RRS) repeats ON (500ms) and OFF (500ms) 20 times.</td></tr>
<tr><td rowspan="2">07</td><td>01</td><td>Warm-up display and aging with jam
(Operation/Procedure)
1. When the simulation is executed, warming up is started.
2. Warm-up time is counted and displayed every second on the copy quantity display.
3. After completion of warm-up, the time count is stopped and the ready lamp is lighted.
4. Press the clear key to clear the warm-up time display, set the copy quantity, and press the START key, and the machine will copy the set quantity repeatedly.</td></tr>
<tr><td>02</td><td>Intermittent aging
(Operation/Procedure)
1. When the simulation is executed, warming up is started.
2. After completion of warm-up, the ready lamp is lighted.
3. Set the copy quantity and press the START key, and the machine will copy the set quantity repeatedly.
4. After 3 sec of the interval time from completion of copying the set quantity, the machine will resume copying.
5. The above operation 4 is repeated.</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>08</td><td>01</td><td>Developing bias
(Operation/Procedure)
When the START key is pressed, the developing bias is outputted for 30 sec.</td></tr>
<tr><td></td><td>02</td><td>Main charger (Grid high)
(Operation/Procedure)
When the START key is pressed, the main charger output is supplied for 30 sec in the grid</td></tr>
<tr><td></td><td>03</td><td>Grid voltage (Low)
(Operation/Procedure)
When the START key is pressed, the main charger output is supplied for 30 sec in the grid</td></tr>
<tr><td></td><td>06</td><td>Transfer charger
(Operation/Procedure)
When the START key is pressed, the transfer charger output is supplied for 30 sec.</td></tr>
<tr><td>10</td><td>None</td><td>Toner motor aging
(Operation/Procedure)
When the START key is pressed, the toner motor output is supplied for 30 sec.</td></tr>
<tr><td>14</td><td>None</td><td>Cancel of troubles other than U2
(Operation/Procedure)
After canceling the trouble, the simulation is also automatically canceled.</td></tr>
<tr><td>16</td><td>None</td><td>Cancel of U2 trouble
(Operation/Procedure)
1. When the START key is pressed, the EEPROM total counter check sum is rewritten and the trouble is canceled.
2. After canceling the trouble, the simulation is also automatically canceled.</td></tr>
<tr><td>20</td><td>01</td><td>Maintenance/mini-maintenance counter clear
When the Print switch is pressed, the maintenance counter is cleared, and 000000 is displayed. When the destination has been set to Japan AB series, the mini-maintenance counter is cleared.</td></tr>
<tr><td>21</td><td>01</td><td>Maintenance cycle setup
The currently set maintenance cycle code is displayed (initial display), and the set data is stored.
<table>
<tr><th>Code</th><th>Setup</th></tr>
<tr><td>0</td><td>3,000 sheets</td></tr>
<tr><td>1</td><td>6,000 sheets</td></tr>
<tr><td>2</td><td>9,000 sheets</td></tr>
<tr><td>3</td><td>13,000 sheets</td></tr>
<tr><td>4</td><td>25,000 sheets</td></tr>
<tr><td>5</td><td>Free (999,999 sheets) * Default</td></tr>
</table></td></tr>
<tr><td></td><td>02</td><td>Mini-maintenance cycle setup (Valid only when the destination is set to Japan AB series.)
The current set code of maintenance cycle is displayed (Initial display), and the set data is stored.
<table>
<tr><th>Code</th><th>Setup</th></tr>
<tr><td>0</td><td>5,000 sheets * Default</td></tr>
<tr><td>1</td><td>10,000 sheets</td></tr>
<tr><td>2</td><td>Free (999,999 sheets)</td></tr>
</table></td></tr>
</table>

Main code	Sub code	Content
22	01	Maintenance/mini-maintenance counter display The display is the same as the total counter value display. When the destination is set to other than Japan AB series, the maintenance counter is displayed. When the destination is set to Japan AB series, the mini-maintenance counter is displayed. The display is the same as the total counter value display.
	02	Maintenance/mini-maintenance preset display The preset value corresponding to the code set in 21-01 and 21-02. The display is the same as the total counter value display. When the destination is set to other than Japan AB series, the maintenance preset value is displayed. When the destination is set to Japan AB series, the mini-maintenance preset value is displayed.
	05	Total counter display The total count value is displayed in 3 digits 2 times repeatedly. <Display example: 12345> 012 → Blank → 345 → Blank → 012 0.7s 0.3s 0.7s 1.0s 0.7s
	06	Developer counter display The display method is the same as the total count value display.
	12	Drum counter display The display method is the same as the total count value display.
	14	P-ROM version display The P-ROM version is displayed in 3 digits on the value display section. (100% Zoom lamp display)
24	06	Developer counter clear When the PRINT switch is pressed, the drum count value is reset to 0.
	07	Drum counter clear When the PRINT switch is pressed, the drum count value is reset to 0.

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>25</td><td>01</td><td>Main motor system ON + Cooling fan low speed
(Operation/Procedure)
When the START key is pressed, the main motor is rotated for 30 sec.
To save toner consumption, the different operations are executed depending on installation of the developing unit.
• When the developing unit is installed, the developing bias, the main charger, and the grid are also outputted.
• When the developing unit is not installed, only the motor is rotated.
* Do not turn on the door open/close switch forcibly to execute this simulation.</td></tr>
<tr><td></td><td>10</td><td>Polygon motor ON
(Operation/Procedure)
When the START key is pressed, the polygon motor is operated for 30sec.</td></tr>
<tr><td>26</td><td>01</td><td>Manual feed setup
(Operation/Procedure)
1. When this simulation is executed, the currently set bypass code number is displayed.
2. Enter the code number corresponding to the bypass and press the START key, and the setting will bechanged.
<table>
<tr><th>Code number</th><th>Bypass</th></tr>
<tr><td>0
1</td><td>Single bypass
Multi bypass</td></tr>
</table></td></tr>
<tr><td></td><td>02</td><td>SPF setup
When this simulation is executed, the currently set SPF code number is displayed. Enter the code number of the SPF to be set and press the PRINT switch. The setup is changed.
<table>
<tr><th>Code number</th><th>SPF</th></tr>
<tr><td>0
1

2</td><td>Without SPF
With SPF (Setup required when installing FAX)
With RSPF</td></tr>
</table></td></tr>
<tr><td></td><td>03</td><td>Second cassette setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of the second cassette is displayed.
2. Enter the code number and press the Start key. The setting is changed.
<table>
<tr><th>Code number</th><th>Second cassette</th></tr>
<tr><td>0
1</td><td>Without second cassette
With second cassette</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td rowspan="3">26</td><td>04</td><td>Machine duplex setup
(Operation/Procedure)
1. When this simulation is executed, the currently set duplex code number is displayed.
2. Enter the code number corresponding to the duplex and press the ENTER key and the setup will be changed.
<table><tr><th>Code number</th><th>Duplex</th></tr><tr><td>0
1</td><td>Without duplex
With duplex</td></tr></table></td></tr>
<tr><td>06</td><td>Destination setup
(Operation/Procedure)
1. When this emulation is executed, the currently set destination code number is displayed.
2. Enter the code number corresponding to the destination and press the START key, and the setting will be changed.
<table><tr><th>Code number</th><th>Destination</th></tr><tr><td>0
1
2</td><td>Inch series
EX AB series
Japan AB series</td></tr></table></td></tr>
<tr><td>07</td><td>Machine conditions check
(Operation/Procedure)
When this simulation is executed, the current machine setting is displayed.
<table><tr><th>CPM</th><th>Copy quantity display</th></tr><tr><td>10 cpm
12 cpm
15 cpm</td><td>10
12
15</td></tr></table>The machine type is shown with the lamp display.
• No setup: None
• BTA-A: AE mode lamp ON
• BTA-B: TEXT mode lamp ON
• BTA-C: Photo mode lamp ON</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>26</td><td>20</td><td>Rear edge void setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of rear edge void setting is displayed.
2. Enter the code number of rear edge void setting and press the START key, and the setting will be changed.

<table><tr><th>Code number</th><th>Rear edge void setting</th></tr><tr><td>0
1</td><td>Rear edge void allowed
Rear edge void not allowed</td></tr></table></td></tr>
<tr><td></td><td>30</td><td>CE mark conformity control ON/OFF setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of CE mark application is displayed.
2. Enter the code number of CE mark application and press the START key, and the setting will be changed.

<table><tr><th>Code number</th><th>CE mark application setting</th></tr><tr><td>0
1</td><td>CE mark application control OFF
CE mark application control ON</td></tr></table></td></tr>
<tr><td></td><td>37</td><td>Cancel of stop at developer life over
When this simulation is executed, the current set code is displayed. Enter a new code and press the PRINT switch, and the entered code is registered.

<table><tr><th>Code number</th><th>Setting</th></tr><tr><td>0
1</td><td>Stop at developer life over
Stop cancel at developer life over</td></tr></table></td></tr>
<tr><td></td><td>39</td><td>Memory capacity setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed.

<table><tr><th>Code number</th><th>Setting</th></tr><tr><td>0
1
2</td><td>No memory
4 Mbyte
6 Mbyte</td></tr></table></td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td rowspan="3">26</td><td>40</td><td>Polygon motor OFF time setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed.

<table><tr><th>Code number</th><th>Setting</th></tr><tr><td>0</td><td>0 sec</td></tr><tr><td>1</td><td>30 sec</td></tr><tr><td>2</td><td>60 sec</td></tr><tr><td>3</td><td>90 sec</td></tr></table></td></tr>
<tr><td>42</td><td>Transfer ON timing control setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed. (For any number different from the following ones, the default time is automatically set.)

<table><tr><th>Code number</th><th>Setting</th></tr><tr><td>0</td><td>Default (330 msec)</td></tr><tr><td>1</td><td>–40 msec</td></tr><tr><td>2</td><td>–30 msec</td></tr><tr><td>3</td><td>–20 msec</td></tr><tr><td>4</td><td>–10 msec</td></tr><tr><td>5</td><td>Default (330 msec)</td></tr><tr><td>6</td><td>+10 msec</td></tr><tr><td>7</td><td>+20 msec</td></tr><tr><td>8</td><td>+30 msec</td></tr><tr><td>9</td><td>+40 msec</td></tr></table></td></tr>
<tr><td>43</td><td>Side void setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of the side void amount is displayed.
2. Enter the code number and press the start key. The setting is changed.

<table><tr><th>Code number</th><th>Setting</th></tr><tr><td>0</td><td>0 mm</td></tr><tr><td>1</td><td>0.5 mm</td></tr><tr><td>2</td><td>1.0 mm</td></tr><tr><td>3</td><td>1.5 mm</td></tr><tr><td>4</td><td>2.0 mm *Default</td></tr><tr><td>5</td><td>2.5 mm</td></tr><tr><td>6</td><td>3.0 mm</td></tr><tr><td>7</td><td>3.5 mm</td></tr><tr><td>8</td><td>4.0 mm</td></tr><tr><td>9</td><td>4.5 mm</td></tr><tr><td>10</td><td>5.0 mm</td></tr></table></td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>30</td><td>01</td><td>Paper sensor status display
The paper sensor status is displayed with the lamps on the operation panel.

<table><tr><th>Display</th><th>Sensor</th></tr><tr><td>Toner cartridge replacement lamp
JAM lamp
Developer cartridge replacement lamp
AE lamp

Exposure level 1 (Light) lamp</td><td>Paper detection before resist (PPD1)
Fusing section paper detection (PPD2)
Paper exit paper detection (POD)
Single manual feed paper detection (MFD)
Cassette A4 width detection (PSW1)</td></tr></table></td></tr>
<tr><td>43</td><td>01</td><td>Fusing temperature setup (Normal copy)
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed.

<table><tr><th>Code number</th><th>Set temperature (°C)</th></tr><tr><td>0
1
2
3
4
5</td><td>175
180
185
190
195 (* Default)
200</td></tr></table></td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>46</td><td>01</td><td>
Copy density adjustment
(Outline)
Used to adjust the copy density in each copy mode. (The copy density can be set by changing the set value of ASIC GAMMA ADJUST register.)
Setting in each copy mode is performed at exposure level 3. When the copy density (exposure) is adjusted arbitrarily, the max, and min. exposure levels are automatically calculated and set. (The change amounts (gradient, change amount) at level 1 – 5 are predetermined.)
(Operation/Procedure)
1. When this simulation is executed, warming up and shading are performed and the current set value is displayed in two digits.
2. Press the copy mode select key to select each setting mode and setting display.
* The copy mode setting is indicated with the following lamps as shown below.
3. Change the setting with the value up-down key and press the START key, and a copy will be made with the entered set value.
4. Press the clear key to store the set value and exit the simulation.

<table>
<tr><th>Copy mode</th><th>Display lamp</th></tr>
<tr><td>AE mode</td><td>AE mode lamp</td></tr>
<tr><td>TEXT mode</td><td>TEXT mode lamp</td></tr>
<tr><td>PHOTO mode</td><td>PHOTO mode lamp</td></tr>
<tr><td>TS mode (TEXT)</td><td>TEXT mode lamp & PHOTO mode lamp</td></tr>
<tr><td>TS mode (AE)</td><td>AE mode lamp & PHOTO mode lamp</td></tr>
</table>

Relationship between the displayed values and the GAMMA ADJUST register

<table>
<tr><th></th><th>Exp1</th><th>Exp2</th><th>Exp3</th><th>Exp4</th><th>Exp5</th></tr>
<tr><td>AE</td><td>–24</td><td>–12</td><td>0</td><td>+12</td><td>+24</td></tr>
<tr><td>TEXT</td><td>–24</td><td>–12</td><td>0</td><td>+12</td><td>+24</td></tr>
<tr><td>PHOTO</td><td>–24</td><td>–12</td><td>0</td><td>+12</td><td>+24</td></tr>
<tr><td>T/S</td><td>–24</td><td>–12</td><td>0</td><td>+12</td><td>+24</td></tr>
</table>

The value displayed after execution of this simulation can be set in the range of 0 – 99 with 50 as the center value.
When the text mode set value is Gat3, for example, the GAMMA ADJUST register value set at Exp1 is:
Text Exp1 = Gat3 – 50 – 24
When 40 is set to Gat3, Text Exp1 = 40 – 50 – 24 = –34
Then set the GAMMA ADJUST register set value to –34.
Perform the same procedure for each mode and each Exp.
* The above table may subject to change.
* For the gradient, there is a similar table, though not specified here. The value set with SIM 46, however, is not reflected.
* The AE mode Exp selection is not specified, but corresponds to the grades for AE exposure selection in the former models.
</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>46</td><td>19</td><td>Gamma table setup
When this simulation is executed, the currently set gamma table code number is displayed. Enter the code number corresponding to your desired gamma table and press the PRINT switch, and the setup will be changed.

<table><tr><th>Code number</th><th>Gamma table</th></tr><tr><td>1
2</td><td>Japan
EX Japan</td></tr></table></td></tr>
<tr><td>48</td><td>01</td><td>Front/rear scan direction
(Outline)
(1) Front/rear scanning direction magnification ratio auto correction: (Performed by changing the set value of ZOOM DATA register for asic.) The width of the reference line marked on the shading correction plate is scanned to perform the front/rear direction magnification ratio adjustment automatically. (Performed by changing the set value of ZOOM DATA register for ASIC.)
(2) Front/rear scanning direction magnification ratio manual correction: Used to set the front/rear (main scanning) direction magnification ratio by key operations. (Performed by changing the set value of ZOOM DATA register for ASIC.)
(3) Scanning direction magnification ratio correction: The scanning direction magnification ratio in the OC mode is set by key operations. (Performed by changing the scanning speed.)

(Operation/Procedure)
1. When this simulation is executed, the current set value is displayed in two digits. (Center value: 50)
2. When the copy mode select key is pressed, the setting mode and the setting display are changed sequentially.
* The selected adjustment mode is indicated by the lamps as follows:
3. In the front/rear scanning direction adjustment, when the START key is pressed, the mirror base unit moves to the white plate for shading and the width of the reference line is read and the correction value is calculated and displayed and the value is stored. In the case of the manual adjustment, enter the adjustment value with the 10-key and press the START key. Then the entered value is stored and a copy is made. (An increase of 1 in the set value corresponds to an increase of 0.1mm.)
4. Press the clear key to store the set value and exit the simulation.

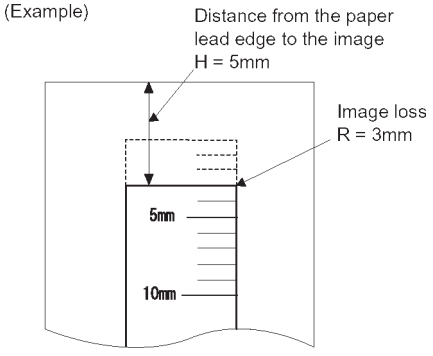
<table><tr><th>Adjustment mode</th><th>Lamps ON</th></tr><tr><td>Front/rear direction magnification ratio auto correction
Front/rear direction magnification ratio manual correction
Scanning direction magnification ratio correction</td><td>AE lamp
TEXT lamp
PHOTO lamp</td></tr></table>
In the front-rear direction magnification ratio correction:
(1) The result of calculation of the scan correction value is ±5% or less, “- -” is displayed.
(Cause) The white plate reference position error or the lens unit installing error
(2) In case of a scanning error of the reference line, the JAM lamp is turned on.
(Cause) CCD error or no white plate
*) If the automatic correction of magnification ratio does not work properly, adjust and correct manually.</td></tr>
</table>

Main code	Sub code	Content
50	01	Lead edge image position adjustment + Paper lead edge/rear edge void adjustment (Outline) This adjustment is used to adjust the copy image position and lead edge/rear edge void amount on the copy paper by adjusting the image scan start position and the print start position (resist roller ON timing) at 100%. (Operation/Procedure) 1. When this simulation is executed, the currently set value is displayed in two digits. (Center value: 50) 2. When the copy mode select key is pressed, each setting mode and the display are changed. * The selected adjustment mode is indicated by the lamps as shown in the table below. 3. Enter the adjustment value with the 10-key and press the start key. The set value is stored and a copy is made. (When the set value is increased by 1, the void amount is shifted by 0.1 mm.) 4. When the clear key is pressed, the set value is stored and the simulation mode is terminated.

Adjustment mode	Lighting lamps
Print start position (Cassette)	AE, Cassette lamps
Print start position (Manual paper feed)	AE, Manual feed lamps
Image lead edge void quantity	TEXT lamp
Image scan start position	PHOTO lamp
Image rear edge void quantity	AE, TEXT, PHOTO lamps

(Adjustment method)
1. Set the print start position (A: AE ON), the lead edge void amount (B: TEXT ON), the scanning start position (C: PHOTO ON) to zero and make a copy of a scale at 100%.
2. Measure the image loss R (mm) of the scale.
   Set as C = 10 ´ R (mm).
   (Example: Set to 30.)
   * When C is increased by 10, the image loss is decreased by 1 mm. (Default: 5)
3. Measure the distance H (mm) from the paper lead edge to the image print start position.
   Set as A = 10 ´ R (mm). (Example: Set to 50.)
   * When the value of A is increased by 10, the image lead edge is shifted toward the paper lead edge by 1 mm. (Default: 50)
4. Set the lead edge void amount as B = 50 (2.5 mm). (Default: 50)
   * When the value of B is increased by 10, the void is increased by about 1 mm.
   (For 25 or less, however, the void amount becomes zero.)

(Example)



<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>50</td><td>10</td><td>Paper center offset + OC/Document center offset
(Outline)
The center offset position of copy image on the copy paper and that of document scan are adjusted by adjusting the scan left margin of ASIC and the print left margin register set value.
(Operation/Procedure)
1. When this simulation is executed, the currently set value is displayed.
2. When the copy mode select key is pressed, each set mode and display are changed.

Machine with single manual paper feed

<table><tr><th>Adjustment mode</th><th>Display lamp</th></tr><tr><td>Print center offset (Cassette paper feed)
Print center offset (Manual paper feed)
OC/Document center offset</td><td>AE,Cassette lamp
AE lamp (Blinking)
AE, TEXT lamp</td></tr></table></td></tr>
<tr><td>51</td><td>02</td><td>Resist quantity adjustment
Used to adjust the contact pressure of paper onto the copier resist roller and the RSPF resist roller.
(Operation/Procedure)
1. When this simulation is executed, the currently set value is displayed.
2. Press the copy mode select key, and each setting mode and display are changed sequentially.
* The selected adjustment mode is indicated by the lamps as follows:
3. Enter the adjustment value with the 10-key and press the SORT key. Then the set value is stored and a copy is made.
4. Press the clear key to store the set value and exit the simulation.

Single manual paper feed

<table><tr><th>Adjustment mode</th><th>Display lamp</th></tr><tr><td>Cassette paper feed
Manual paper feed</td><td>AE, Cassette lamp
AE blinking (Cassette lamp ON)</td></tr></table></td></tr>
<tr><td>61</td><td>03</td><td>Polygon motor check (HSYNC output check)
(Operation/Procedure)
When the START key is pressed, HSYNC is performed and the polygon motor is rotated for 30 sec. At that time, the Zoom lamp is lighted for 100msec every time when HSYNC is detected.</td></tr>
<tr><td>63</td><td>01</td><td>Shading check
(Outline)
Used to display the detection level of the white plate for shading. (Vref of AD conversion IC is fixed.)
(Operation/Procedure)
When the START key is pressed, the mirror base unit moves to the white plate for shading and Vref+ voltage of AD conversion IC is set to 4.5V and Vref- voltage to 0.5V, and the copy lamp is lighted.
This state is kept for 10 sec, and the level of one pixel at the center is detected every second to display on the value display section.</td></tr>
</table>

Main code	Sub code	Content
64	1	Self print only with the engine (1 by 2 mode) (Outline) Used to print in the 1 by 2 mode by ignoring the state of the optical system. (Operation/Procedure) 1. When this simulation is executed, warming up is made and the ready lamp is lighted. 2. Select with the cassette select key and press the start key. Paper is fed from the cassette and printing is performed. In the 1 by 2 mode, one line is printed and two lines are not printed.

6.2 Trouble codes

6.2.1 List of Trouble Codes

Main code	Sub code	Trouble content	Detail of trouble
E7	03	HSYNC not detected.	LSU (laser diode, reception element, APC circuit) trouble LSU drive circuit (ASIC) trouble
E7	04	CCD white level trouble	CCD drive circuit (CCD PWB, ASIC harness) trouble Copy lamp lighting trouble (Copy lamp, invertor PWB)
E7	05	CCD black level trouble	CCD drive circuit (CCD PWB, ASIC, harness) trouble
E7	12	Shading trouble (White correction	Dirt on white plate for scanning white level
E7	14	ASIC connection trouble	Improper connection between CPU and ASIC (pattern cut, improper connection of lead pin)
E7	15	Copy lamp disconnection trouble	Copy lamp or copy lamp drive circuit (invertor PWB) trouble Copy lamp disconnection
E7	16	Abnormal output of laser	LSU (laser diode, reception element, APC circuit) trouble LSU drive circuit (ASIC) trouble
L1	00	Feeding is not completed within the specified time after starting feeding	When the mirror base is returned for the specified time (6 sec.) in mirror initializing after turning on the power, the mirror home position sensor (MHPS) does not turn OFF. Or when the mirror base is fed for the specified time (about 6 sec) after start of copy return, the mirror home position sensor (MHPS) does not turn OFF.
L3	00	Return is not completed within the specified time	When the mirror base is returned for the specified time (6 sec.) in mirror initializing after turning on the power, the mirror home position sensor (MHPS) does not turn ON Or when the mirror base is returned for the specified time (about 6 sec) after start of copy return, the mirror home position sensor (MHPS) does not turn ON.
L4	01	Main motor lock	When the main motor encoder pulse is not detected for 100 msec.
L6	10	Polygon motor lock	The lock signal (specified rpm signal) does not return within a certain time (about 20 sec) from starting the polygon motor rotation.
H2	00	Thermistor open detection	The fusing thermistor is open.
H3	00	Heat roller abnormally high temperature	The fusing temperature rises above 240 °C.
H4	00	Heat roller abnormally low temperature	The fusing temperature does not reach 185 °C within 27 sec of turning on the power, or the fusing temperature keeps at 140 °C.

Main code	Sub code	Trouble content	Detail of trouble
U2	01	Counter sum check error.	When the counter check sum value stored in the EEPROM is abnormal.
U2	04	EEPROM serial communication error	When a communication trouble occurs with the EEPROM.

■

7. MAINTENANCE

7.1 Maintenance table

×: Check (Clean, adjust, or replace when required.) ○: Clean ▲: Replace : Adjust ☆: Lubricate

Section	Parts	25K	50K	75K	100K	125	Remark
Developing	Developer	▲	▲	▲	▲	▲	
	DV blade	○	▲	○	▲	○	
	DV side seal (F/R)	○	▲	○	▲	○	
Process peripheral	Drum	▲	▲	▲	▲	▲	

7.2 Maintenance display system

Toner	Life	6.5K	
	Remaining quantity check *1	a. Press and hold the density adjustment LIGHT key for more than 5 sec, and the machine will enter the user program mode. b. Press and hold the "%" key for more than 5 sec, and the remaining quantity will be displayed on the copy quantity display in one of the following levels: (Remaining quantity display levels: 100%, 75%, 50%, 25%, 10%, LO) c. Press the density adjustment LIGHT key to cancel.	
	Remaining quantity	NEAR EMPTY About 10%	EMPTY
	LED	ON	Flash
	Machine	Operation allowed	Stop
Developer	Life	25K	
	LED	ON at 25K of the developer count.	
	Machine	Selection is available between Not Stop and Stop by Service Simulation (SIM 26-37) Setup. (If Stop is selected, the LED will flash and stop at 25K.) * Default: Not Stop * Clear: SIM 24-06	
Maintenance	LED	Selection is available among 18K, 13K, 9K, 6K, 3K, and free (no lighting) with SIM 21-1. * Default: 25 K * Clear: SIM 20-1	
	Machine	Not stop.	

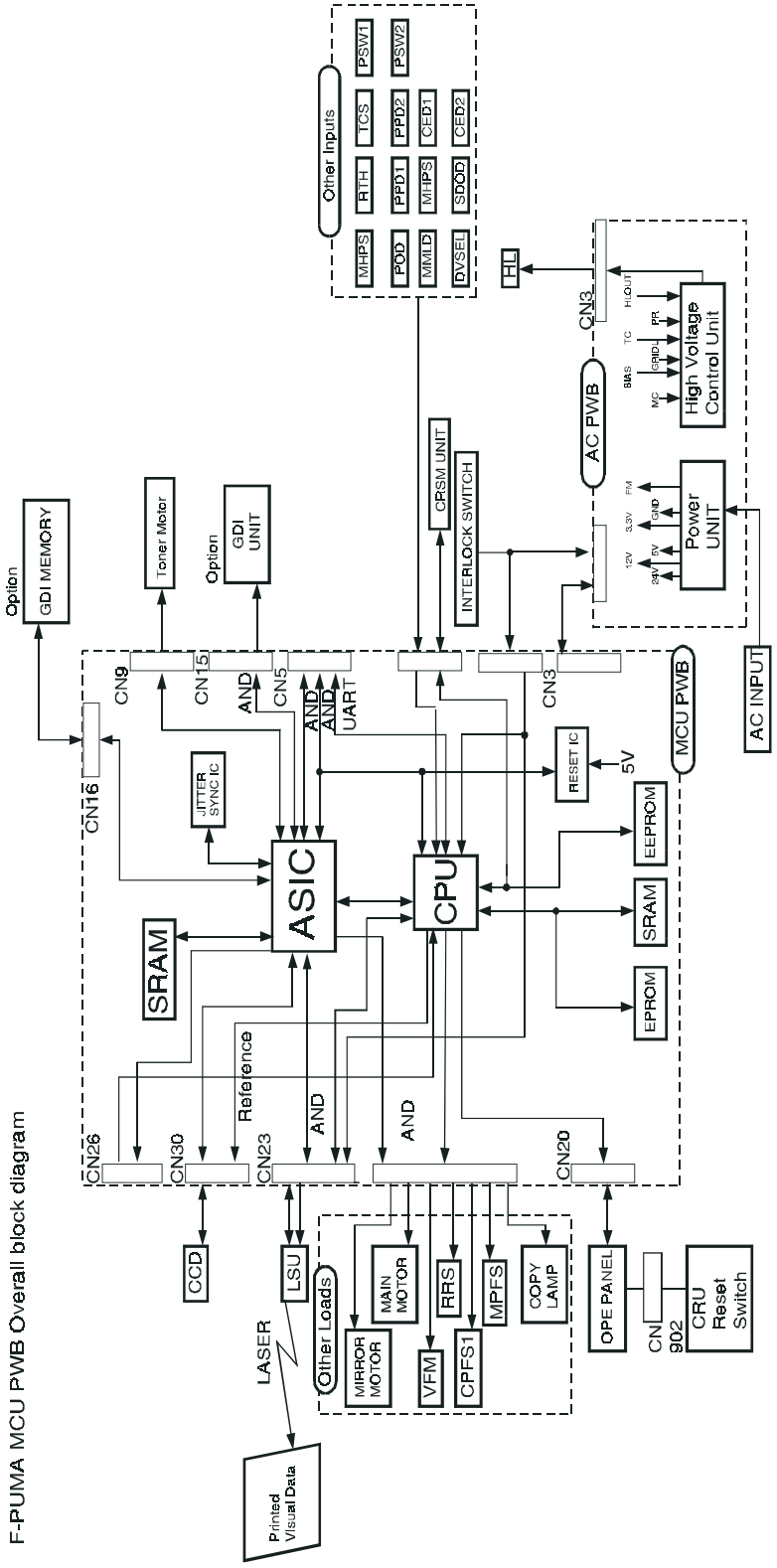
*1: Installation of a new toner cartridge allows to display the remaining quantity.

■

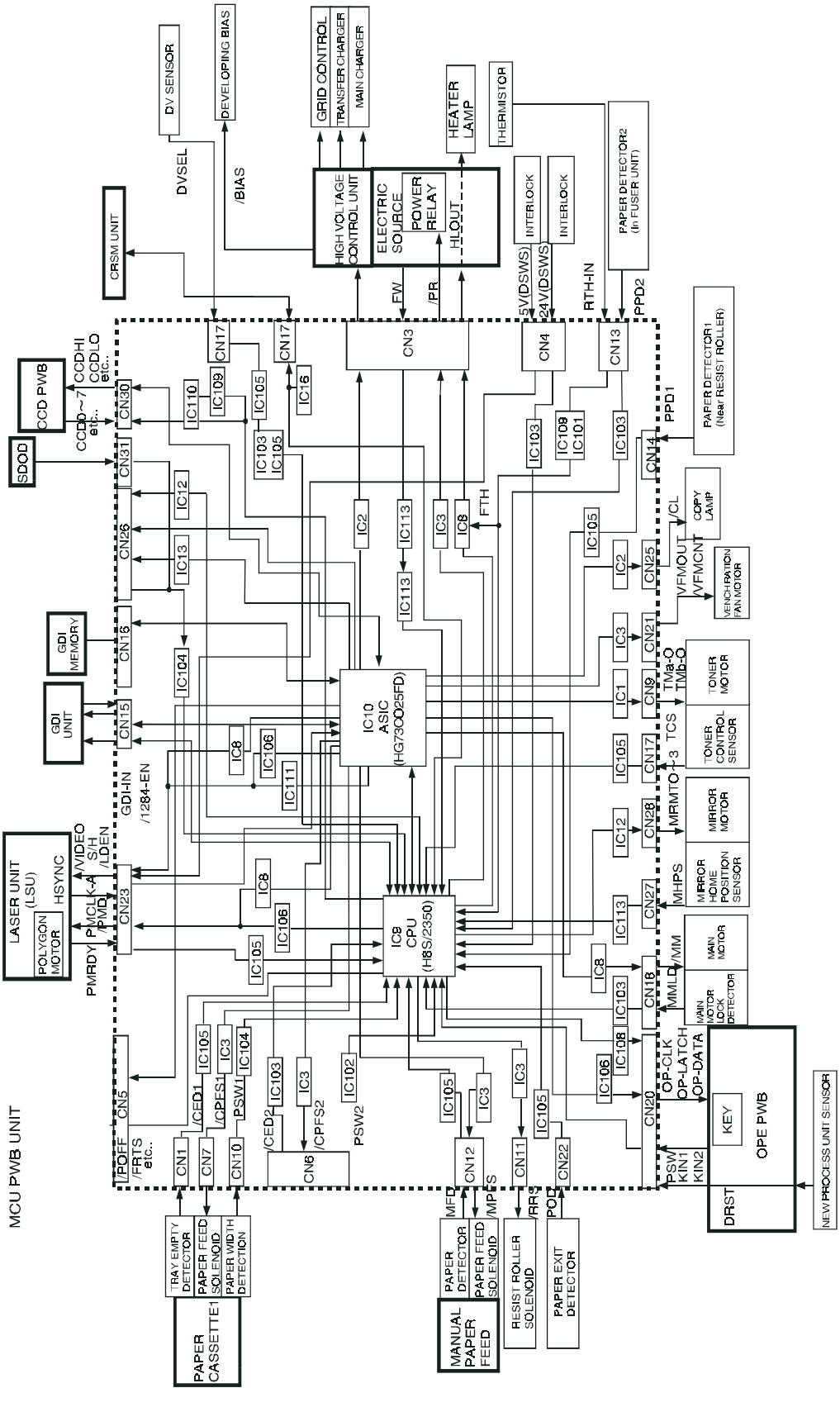
8. ELECTRICAL SECTION

8.1 Block diagram

8.1.1 Overall block diagram



8.2 MCU PWB unit



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9. USER PROGRAM

The conditions of factory settings can be changed according to the use conditions.

9.1 Functions that can be set with the user program

Function	Contents	Factory Setting
Auto clear time	When a certain time is passed after the completion of copying, this function returns to the initial state automatically. The time to reach the initial state can be set in the range of 30 sec to 120 sec by the unit of 30 sec. This function can be disabled.	60 sec
Preheat	When the copier is left unused with the power ON, the power consumption is automatically reduced to about 40Wh/H (* Note). The time to start this function can be set in the range of 30 sec to 90 sec by the unit of 30 sec. This function cannot be disabled. When this function is operated, the pre-heat lamp on the operation panel lights up. To return to the initial state, press any key on the operation panel. (When the COPY button is pressed, a copy is made after returning to the initial state.)	30 sec
Auto shut off timer	When the copier is left unused with the power ON, the power consumption is automatically reduced to about 18Wh/H (* Note). The time to start this function can be set in the range of 2 min to 120 min. When this function is operated, all the lamps except for the pre-heat lamp on the operation panel turn off. To return to the initial state, press the COPY button.	5 min
Auto shut off	Used to set or cancel this function	Set

*** Note:** The power consumption values in preheat and auto shut off may be varied depending on the use conditions.

9.2 Setting the Power Save Modes and Auto Clear Time

1) Press and hold down the light (◁) and dark (▷) keys simultaneously for more than 5 seconds until all the alarm indicators (, , and) blink and "- -" appears in the display.
2) Use the left copy quantity (△) key to select a user program number (1: auto clear time, 2: preheat mode, 3: auto power shut-off timer, 5: auto power shut-off mode). The selected number will blink in the left side of the display.

Function name	Function code
Auto clear time	1
Preheat	2
Auto shut off timer	3
Auto shut off	5

Note: If a wrong code is entered press the clear key and enter the correct function code.

3) Press the Print (⑨) key. The entered program number will be steadily lit and the currently selected parameter number for the program will blink on the right side of the display.

4) Select the desired parameter using the right copy quantity (△) key. The entered parameter will blink on the right of the display.

Function Name	Set code	Function Name	Set code	Function Name	Set code	Funtion Name	Set code
Auto clear time	0 (Cancel) 1 (30 sec) *2 (60 sec) 3 (90 sec) 4 (120 sec) 5 (10 sec)	Preheat	*0 (30 sec) 1 (60 sec) 2 (90 sec)	Auto shut off timer	0 (2 min) *1 (5 min) 2 (15 min) 3 (30 min) 4 (60 min) 5 (120 min)	Auto shut off	0 (Cancel) *1 (Setting)

*: Factory setting

5) Press the print (⑨) key. The right-hand number in the display will be steadily lit and the entered value will be stored.
Note: To change the setting or to set another mode, press the Clear (Ⓒ) key. The copier will return to step 2).

6) Press the light (◁) or dark (▷) key to return to the normal copy mode.

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